Rhodora

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RHODORA.—**A monthly journal of botany, devoted primarily to the flora of New England. Price, $2.00 per year, net, postpaid, in funds payable at par in United States currency in Boston; single copies (if available) 20 cents. Volumes 1–8 or some single numbers from them can be supplied only at advanced prices which will be furnished on application. Notes and short scientific papers, relating directly or indirectly to the plants of the northeastern states, will be considered for publication to the extent that the limited space of the journal permits. Forms will be closed five weeks in advance of publication. Authors (of more than two pages of print) will receive 25 copies of the issue in which their contributions appear. Extracted reprints, if ordered in advance, will be furnished at cost.**

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THE NEW ENGLAND BOTANICAL CLUB

Vol. 39. July, 1937. No. 463.

"ALFILERIA (FILAREE) SEED"

WILLIAM A. DAYTON

ALTHOUGH annual, often small, and typically of a rosette growth habit, our American species of alfileria, filaree and heronbill (*Erodium* spp.) are important spring and winter range forage plants for domestic livestock and game animals, especially on dry, warm foothill and "desert" ranges from western Texas to southern California. Together with Indian-wheat (native annual *Plantago* spp.) they are outstanding sheep "weeds" on desert lambing grounds about Phoenix, Ariz. Their curious carpels, so wonderfully fitted for the perpetuation of the species in their frequently austere environment, have attracted the attention of botanist and layman alike.[1] Knuth[2] gives the total number of species as about 60. Hanks and Small[3] attribute six species to North America, three native and three naturalized, but one of these (*E. californicum*) is regarded by most American botanists as merely a subspecies or variety of another Pacific species (*E. macrophyllum*). About eight other (Old World) species of *Erodium* have been collected at various times in this country but they are rare, local, and without economic importance; the six (or five) species listed by Hanks and Small (*op. cit.*) two decades ago are still the important "filarees" of this country.

Considerable attention has been paid to erodiums as rock-garden plants, particularly in Europe; Irving[4] has annotated 14 of the more

[1] Finn, O. B. The brace and bit plant. Sci. Amer. 139: 426–7. 1928.

[2] Knuth, R., Geraniaceae, *in* Engler, A., and Harms, H. Die natürlichen Pflanzenfamilien 19a: 43–66. 1931.

[3] Hanks, L. T., and Small, J. K., Geraniaceae, *in* North American Flora 25: 3–24. 1907.

[4] Irving, W. The heronsbill family. Garden 87 (2693): 329–331. 1923.

promising ornamental species. Interest in our American species, however, is almost exclusively from the standpoints of forage and range protection. As long ago as 1909 Sampson investigated the possibility of using alfileria (*E. cicutarium*) in artificial range reseeding and has published some very significant facts discovered by that study.[1] Interest in this subject is increasing and to-day over a dozen western seed houses carry "alfileria seed," usually without distinction of species. Examination of this "seed" indicates that it is frequently a mixture of two (occasionally more than two) species. So far as this writer has yet been able to ascertain, no ready means of distinguishing

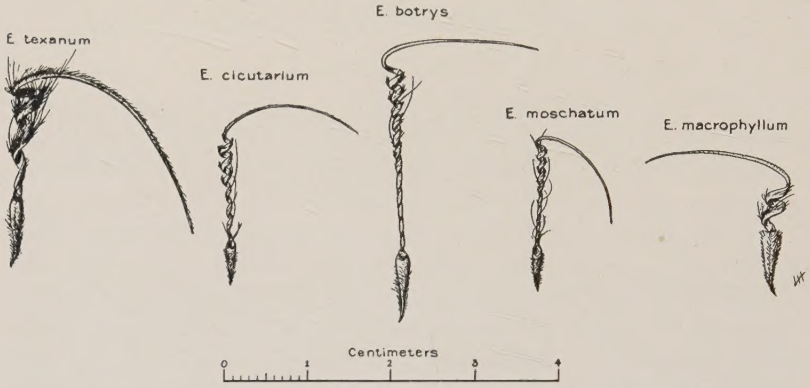


FIG. 1. Mature carpels of common West-American "alfilerias," or "filarees."

the "seed" of these common Southwestern species of *Erodium* has hitherto been published, and it seems desirable that this be done: (1) So that the buyer will be able to know what he is purchasing, and (2) To facilitate further needful studies as to the relative usefulness of the several species in various localities and under diverse conditions.

The peculiar, terminal, hygroscopic, dextrorse-spirally twisted appendage of the alfileria-filaree-heronbill carpel is variously designated by botanists as the beak, carpel tail, style-column, etc. For purposes of his key, the writer thinks it advantageous to use a different terminology, under which three sections of the carpel are recognized: (1) The *corpusculum,* or carpel-body, as distinct from its tail-like appendage; (2) the *spirillum,* or spirally coiled portion of the "beak,"

[1] Sampson, A. W. Collection and sowing of alfilaria seed. Rev. For. Serv. Invest. 2: 14–16. 1913.

and (3) the *flagellum*, or free, arcuate, flail-like terminal portion of the "beak." These portions are all readily recognizable in the mature carpels ("seeds" of the florist). Brumhard[1] was, perhaps, the first to direct attention to the characters of the scar-like foveole at the top of the carpel-body in this genus, and Eig[2] has followed his example.

CARPEL KEY FOR COMMON WEST-AMERICAN "ALFILERIAS"

Corpusculum 4 to 5 mm. long.
  Foveole inconspicuous, circular, about 0.5–0.75 mm. long.
    E. cicutarium (alfileria).
  Foveole conspicuous, shouldered, oblong, about 1.5 mm. long.
    Flagellum mostly reflexed, its span usually shorter (10–12.5 mm.) than that of *cicutarium* (about 15 mm.).
      E. moschatum (musk filaree).
Corpusculum 7 to 10 mm. long.
  Corpusculum truncate, rather uniformly and densely beset with appressed or moderately spreading, both grayish-white and tawny hairs; spirillum usually with only 2 or 3 turns.....**E. macrophyllum** (California heronbill).
  Corpusculum not truncate at apex, sparsely pubescent.
    Spirillum with numerous turns, about 18–21 mm. long; flagellum short-grayish-white-pubescent. Corpusculum hairs semi-appressed, whitish.....**E. botrys** (big heronbill).
    Spirillum usually with about 4 turns, about 8–12 mm. long; flagellum conspicuously tawny-hairy, with a span of 20 mm. or more. Corpusculum hairs spreading, both grayish-white and tawny.....**E. texanum** (Texas heronbill).

RANGE FORAGE INVESTIGATIONS,
Division of Range Research, U. S. Forest Service.

RANGE EXTENSIONS IN NORTH CAROLINA.—On July 19, 1936, while motoring near Jonas Ridge in Burke County, North Carolina, I found a small bog filled with a solid growth of *Juncus Smithii* Engelm. A few days before Dr. H. M. Jennison had shown me this very local species in the Smoky Mountains of Tennessee; otherwise I might very likely have overlooked it. It is now known from Schuylkill County, Pennsylvania, Walton County, Florida, Blount County, Tennessee (RHODORA, Vol. 37, p. 313) and from Burke County, North Carolina.

In 1933 I collected *Scrophularia lanceolata* Pursh, growing on the lower slopes of Grandfather Mountain in Avery County, North

[1] Brumhard, P. Monographische Übersicht der Gattung Erodium. Arb. Bot. Gart. Univers. Breslau, 59 pp. 1905.

[2] Eig, A. Revision of the Erodium species of Palestine. Beih. Bot. Centralbl, 50. Abt. 2, Hft. 1: 226–240. 1932.

Carolina, and again this summer I found it near Pineola in the same County. I believe this is new to the state and extends the southern limit of its range from Virginia into North Carolina. The species is not included in Small's Flora which covers North Carolina.—FRANCIS WELLES HUNNEWELL, Wellesley, Mass.

MONOGRAPHIC STUDIES IN THE GENUS ELEOCHARIS. IV

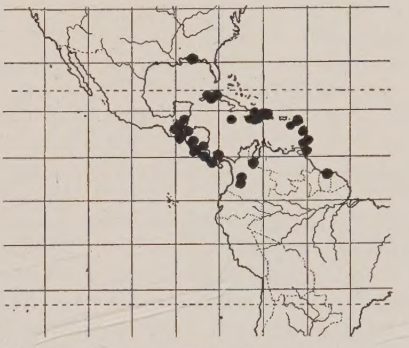
H. K. SVENSON

(*Continued from page 231*)

10. E. RETROFLEXA (Poir.) Urban (PL. 461, FIG. 11). MAP 8. Cespitose, often proliferous annual (?) with fibrous roots: culms green, filiform, *usually recurved*, 2–2.5 cm. long, flattened to deeply quadrangular-sulcate, obscurely punctate: sheath stramineous to reddish, obtuse, scarious and inflated at the summit: spikelets few- to many-flowered, the *scales usually spreading in fruit:* scales green, keeled, obtuse to acute, often with chestnut to reddish-brown sides: style 3-fid: achene 1.0–1.2 mm. long, trigonous, *cancellate*, costate, obovoid to urceolate, white or stramineous: style-base light brown, as wide and 1/3 as long as the body of the achene, *pyramidal-acuminate*, the *angles decurrent on the costae of the achene:* bristles white, shorter than the achene.—Symb. Ant. ii. 165 (1900); Britton & Wilson, Bot. Porto Rico & Virgin Is. v[1]. 92 (1923); Small, Man. 164 (1933); Uittien in Pulle, Fl. Surinam i. 112 (1934). *Scirpus retroflexus* Poir. in Lam. Encyc. vi. 753 (1804). *Cyperus depauperatus* Vahl, Enum. ii. 305 (1805). *Baeothryon retroflexum* A. Dietr. Sp. Pl. ii. 93 (1833). *Eleocharis depauperata* Kunth, Enum. ii. 140 (1837). *Chaetocyperus polymorphus* Nees & Lindl. α *depauperatus* Nees in Mart. Fl. Bras. ii[1]. 94 (1842); Liebmann, [Mexicos Halvgraes] Vidensk. Selsk. Skr. ser. 5, ii. 242 (1851). *C. niveus* Liebm. and *C. viviparus* Liebm. (l. c.). *Chaetocyperus rugulosus* Nees, Bonplandia iii. 86 (1855) [Panama]. *Heleocharis triflora* Boeckl. Flora lxiii. 437 (1880) acc. to Britton.[1] *E. Chaetaria* Britton, Journ. N. Y. Mic. Soc. iii. 105 (1889); Mohr, Contr. U. S. Nat. Herb. vi. 398 (1901); and other auths. as to American plants only.—Alabama, West Indies, and abundantly throughout the American tropics, Poiret's type coming from Porto Rico. ALABAMA: copiously about the spring, Daphne, eastern shore of Mobile Bay, Aug. 23, 1896, *Mohr* (NY, US). CUBA [all known collections are from Pinar del Rio and Havana provinces]: Pinar del Rio, *Shafer* no. 335 (NY); Sierra de Cabra, *Britton* & *Cowell* no. 9808 (NY); Rio Mestanza,

[1] Probably, however, *E. parvula* var. *anachaeta* (see RHODORA xxxi. 177 (1929) and xxxvi. 388 (1934)), conforming especially well with Boeckeler's description of the style-base "rostro minuto viridulo triangulari acuto, basi haud prominente."

Britton & Cowell no. 10153 (NY); Vinales, *Ekman* no. 18001 (G); Herradura, *Ekman* no. 17792 (G); in humidis, Anafe, Havana, *Ekman* no. 236 (G, NY); Laguna del Ariguanabo, Havana, *León* & *Edmund* no. 874a (NY) and *León* & *Nivard* no. 7622 (NY); wet savannas, Chirigota, *C. Wright*, Oct. 30, 1865 (NY); *C. Wright* no. 3764 (G, NY) and 3367 (G) in part; *C. Wright* 3377 (G) (as *Sc. natans* Grisebach). JAMAICA: Portland side, *Britton* no. 3533 (NY); Port Antonio, *A. E. Wight* no. 88 (NY); Ashkenish, *Britton & Hollick* no. 2191 (NY); 400 m. alt., Dolphin Head, *Britton & Hollick* no. 2239 (NY); New Castle, *Britton* & *Hollick* no. 1774 (NY); 2500–2800 ft. alt., Bull Head Mountains, *Harris* no. 12,266 (G, NY); growing round edges of ponds near Ewarton, *Harris* no. 8512 (NY); 2000 ft. alt., Kellits, Upper Clarendon, *Harris* no. 11,150 (CO, G, NY); Castleton Gardens, *Harris* no. 12,320 (NY); growing amongst grasses at 2500 ft. alt., Upper Clarendon, *Harris* no. 11,106 (NY); near Ewarton, *L. M. Underwood* no. 1862 (NY); Moody's Gap, *Britton* no. 3410 (NY); Troy, Cockpit Country, *Britton* no. 451 (NY); Cornwall, Lacovia, *Britton* no. 1494 (NY); plain of Westmoreland, *Purdie* (G, NY). SAN DOMINGO: *C. Wright, Parry & Brummel* no. 597 (NY); sea level to 100 m., Villa Riva, Prov. Pacificador, *Abbott* no. 557 (G, NY, US). PORTO RICO: Caquas, *O. Kuntze* in 1874 (NY); Sierra de Naguabo, *Shafer* no. 3575 (NY); Sierra de Luguillo, *Sintenis* no. 1403 (G); in mud along brook, Las Cruces, *Britton* no. 9531 (NY); Colonia San Miguel, *Britton & Shafer* no. 1630 (CO, G, NY); Sierra de Naguabo, *Britton & Cowell* no. 2108 (NY); San Juan, *Heller* no. 669 (NY); Sierra de Naguabo, *Shafer* no. 3511 (NY); Sabana Aboja, *Britton* no. 9199 (NY) and no. 9364 (NY); Yunque, *F. L. Stevens & Hess* no. 2813 (NY) and 4824 (B); wet sand, Laguna Tortuguero, *Britton* no. 9908 (NY); Monte Cerrote, *Britton & Brown* no. 5406 (NY); mountain between Guayama and Cayey, *Britton & Brown* no. 6575 (NY); Rio Piedras *Hioram* in 1914 (NY); Sierra de Loquillo, *Blanner* in 1852 (NY). ANTIGUA: *Duss* no. 77 (NY). MONTSERRAT: Gagris Mountain, about 1500 ft., *Shafer* no. 383 (NY). GUADELOUPE: *Duss* no. 3739 (CO, NY). DOMINICA: "Sylvania" 1500–1800 ft., *Cooper* no. 124 (NY); Laudat, *F. E. Lloyd* no. 329 (NY). MARTINIQUE: *Duss* no. 224 (NY) and 4521 (NY). GRENADA: Black Forest, *Broadway* in 1896 (NY). TRINIDAD: St. Augustine, *Britton, Hazen & Freeman* no. 954 (G, NY); Oropuche,



MAP 8. Range of ELEOCHARIS RETROFLEXA.

Broadway no. 7920 (B). British Honduras: Aquatic growing in shallow water, *Schipp* no. 690 (NY); growing at water's edge, forming dense mats, Big Creek, *Schipp* no. 192 (NY). Guatemala: Coban, Depart. Alta Verapaz, alt. 4300 ft., *Türckheim* no. 900 (NY, US); Quirigua, Depart. de Izabal, alt. 75–225 m., *Standley* nos. 24171 (NY) and 24277 (G, NY); Puerto Barrios, Depart. de Izabal, at sea level, *Standley* no. 24743 (NY); vic. Puerto Barrios, *Pittier* no. 369 (G, US); Quebradas, Depart. Izabal, *S. F. Blake* no. 7518 (G, US); Cubilquitz, Depart. Alta Verapaz, alt. 350 m., *Türckheim* no. 8613 (G, NY). Honduras: vic. of Tela, *Standley* no. 56624 (NY). Salvador: Ixtepeque, Depart. de San Vincente, alt. 400 m., *Standley* no. 21453 (NY); San Salvador, *Bernoulli* no. 7 (NY). Nicaragua: Cartago [probably from Costa Rica], *Oersted* in 1846 (Cop) (type of *Chaetocyperus niveus*); San Juan de Nicaragua, *Oersted* in 1846 (Cop) (as *Chaetocyperus polymorphus* β *capillaceus*); vulcano Irasee, alt. 10,000′, *Oersted* in 1847 (Cop) (as *Ch. viviparus* Nees). Costa Rica: Rodeo, *Tonduz* no. 1619 (US); La Palma, *Tonduz* no. 12646 (US); Buenos Aires, *Tonduz* no. 4889 (Cop); Las Vueltas, *Tonduz* no. 13324 (NY). Panama: Colon, *Kuntze* no. 1852 (NY); Rio Tecumen, Prov. Panama, *Standley* no. 26657 (NY); El Boquete, Chiriqu, alt. 1000–1300 m., *Maxon* no. 5380 (NY, US); Laguna de Paratala, Prov. Panama, *Pittier* no. 4601 (NY, US); El Boquete, 1400 m., *Killip* no. 4533 (NY, US); near Chepo, *Pittier* no. 4559 (G, NY). Venezuela: Tovar, *Fendler* no. 1584 (G, NY). Colombia: alt. 1500–1600 m., Dept. El Valle, *Pennell* & *Killip* no. 5981 (G, NY); San Pablo, *E. André*, alt. 1280 m., no. 4279[1] (G, NY) (as *E. tenuissima*); Dept. El Valle, *Pennell* & *Killip* no. 5309 (G, NY). Surinam: *Schweinitz* no. 6 (NY); Paramaribo, *Hohenacker* no. 1856 (CO). Brazil: *Schrader* (CO) (*Scirpus punctatus* Schrader).

E. retroflexa, more frequently collected than any other small species of *Eleocharis* from the American tropics, and easily recognized by the recurved culms and trigonous cancellate achenes, is, so far as I know, not found south of Brazil, and in the United States has not been seen since Mohr's discovery of the species in Alabama in 1896.

Chaetocyperus obtusatus Nees in Mart. Fl. Bras. ii[1]. 94 (1842), the description resting wholly upon Tweedie's immature specimen in hb. Lindley, has been placed in the synonymy of *E. retroflexa* by most authors, but is maintained by Boeckeler (Linnaea xxxvi. 432 (1869–70)) under *E. acicularis*.

11. E. glauca Boeckl. (Pl. 461, fig. 2). Map 9. Semi-aquatic, *with long rootstocks (or stolons)*: culms 2–5 cm. high, *erect, rigid, glaucous green*, irregularly sulcate: sheaths reddish, loose, scarious and marcescent at the apex: spikelets ovate to narrowly lanceolate, 2–6 mm. long, about 6–15-flowered: scales scarcely keeled, appressed, obtuse

ELEOCHARIS, SERIES TENUISSIMAE (habit × ½, spikelets × 2½, achenes × 20). FIGS. 1–4 and 7, E. MINIMA: FIG. 1, *E. Durandii;* 2, *E. Jamesonii;* 3, *E. Wrightiana;* 4, var. AMBIGUA; 7, Brazilian plant. FIG. 5, E. URCEOLATA. FIG. 6, E. OLIGANTHA. FIG. 8, E. ALVEOLATA. FIGS. 9–11, E. MICROCARPA: FIG. 9, var. FILICULMIS; 10, typical; 11, var. BRITTONII. FIGS. 12 and 13, E. BALDWINII.

to acute, with a prominent thickened green center and thin brownish sides: style 3-fid: achene trigonous, obtuse-angled, *obovate-urceolate*, 0.8 mm. long, stramineous to brownish-gray, *cancellate:* style-base low-pyramidal, apiculate in the center, light brown, *deeply 3-crested at the base:* bristles white, rudimentary.—Kjoeb. Vidensk. Meddel. 1871. 150 (1871). *E. arenaria* Benth. Journ. Bot. ii. 244 (1850); C. B. Clarke, Kew Bull. Add. Ser. viii. 106 (1908) (nomen) and Ill. Cyp. t. xxxvii, f. 8–12 (1909). *E. alveolata* Svenson, Rhodora xxxi. 241 (1929), as to Brazilian specimens.—Brazil: in vicinibus Santarem, Prov. Pará, *Spruce* "Eleocharis (Scirpidium) (3)" Aug. 1850 (G, NY) (type collection); Santarem, *Spruce* "Scirpidium (4)" Sept. 1850 (NY); vic. Pará, *C. F. Baker*, no. 416 (Pom.).

Map 9. Range of Eleocharis glauca.

This species is near *E. retroflexa*, but has erect spongy culms, longer spikelets, and smaller achenes with decidedly different tubercles. Spruce's "Eleocharis (Scirpidium (5)" (G, NY) from Santarem perhaps belongs with this species, but the material is too poor for definite determination.

Bentham's informal account of *E. arenaria*, based on a Spruce collection from Pará (1849) describes "an *Eleocharis* of the section *Chaetocyperus*, which has been distributed as new, under the name of *E. arenaria*. A further examination, however, induces me [Bentham] to suspect that it may be a mere variety of *Ch. bonariensis* Nees, differing in the number of setae, six instead of three, and the more distinctly granular achenia. It forms large patches on the sand at Caripi, and serves to bind the sand." This meagre description was amplified by Clarke's detailed illustration, thereby the species may be said to have achieved publication but much later than Boeckeler's publication of *E. glauca*. It is on the basis of Clarke's illustration, and the fact that the material was derived from the same locality, that I cite *E. arenaria* as a synonym of *E. glauca*.

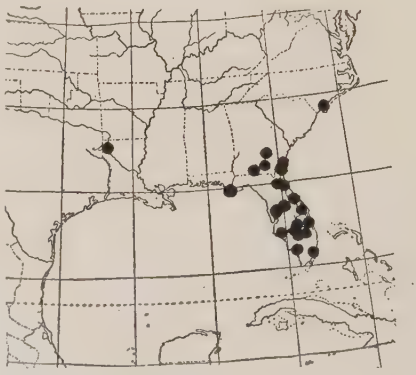
12. E. alveolata Svenson (Pl. 460, fig. 8). Map 10. *Forming dense mats:* culms 2–5 cm. long, frequently *recurved*, capillary, triangular to sulcate-quadrangular, punctate: sheaths reddish brown, firm, scarious, and a little inflated at the apex: spikelets *linear*, *acute*, 2–3 mm. long, usually sterile: *scales 3–4*, linear, strongly keeled, brown with a hyaline margin: style 3-fid: achenes, *most frequently situated at the culm-bases*, acutely trigonous, 1–1.3 mm. long (including the prominent style-base), obovate, narrowed at base and apex, stipitate, shining, olivaceous to whitish, *prominently cancellate:* style-

base trigonous, elongated, conical, *acuminate*, from a broad base: bristles lacking.—Rhodora xxxi. 241 (1929) excluding citations from Brazil. *Scirpus capillaceus* Griseb. Cat. Fl. Cubens. 239 (1866), not *E. capillacea* Kunth. *Heleocharis capillacea* Kükenthal in Fedde, Rep. Spec. Nov. xxiii. 191. (1926), not Kunth.—Sandy pine-lands of Western Cuba. Pinar del Rio: Herradura, *Ekman* no. 17788 (type G) (NY, S); Mendoza, *Ekman* no. 18761 (at least in part) (NY, S); Laguna Los Indios, *Shafer* no. 10817 (NY); Laguna Jovero, *Shafer* no. 10900 (NY); Hacienda San Julian, south of Guane, *León* & *Roca* no. 6953 (NY). Isle of Pines: Laguna Santa Rosalia, *Britton*, *Britton* & *Wilson* no. 15621 (G, NY). Without locality: *C. Wright* (as *Anisostachya decipiens* (Wr.) (NY); *C. Wright* no. 3367, in part (G).

Map 10. Range of Eleocharis alveolata.

The spikelets superficially resemble those of *E. capillacea* Kunth, a species confined to tropical South America. They are nearly always sterile, a fact which has brought about confusion with *E. capillacea*.

13. E. Baldwinii (Torr.) Chapman, (Pl. 460, figs. 12, 13). Map 11. Perennial, *forming loose tufts:* rootstocks (rarely present) loosely branched-ascending, the fibrous white roots numerous: culms *usually wiry, capillary*, 3–20 cm. long, often proliferous, dull green, flattened-sulcate, punctate: sheaths prominent, red to yellow, the apex acute: spikelets *flattened, linear to ovate*, 3–6 mm. long, 3–8-flowered: scales linear, acute, strongly keeled, red to faded brown, the lowest scale much shorter: style 3-fid: achene 1 mm. long, sharply triangular, *dark olive-brown*, frequently obscurely striolate: *style-base short- to long-pyramidal*, sharply angled, subulate tipped, brownish: bristles shorter than the achene, brownish-tinged, obscurely toothed.—Fl. S. U. States 519 (1860); Small, Man. 165 (1933). *Chaetocyperus Baldwinii* Torr. Ann. Lyc. N. Y. iii. 295 (1836). *E. prolifera* Torr. Ann. Lyc. N. Y. iii. 316 (1836) (in part); Small, Fl. Se. United States 185 (1903) and Man. 165 (1933).—Sandy soil in pine



Map 11. Range of Eleocharis Baldwinii.

barrens along the coastal plain, North Carolina to Louisiana. North Carolina: pine barren exsiccated ponds, Wilmington, *M. A. Curtis* [3 cm. high, dwarf form with basal spikelets] (NY). Georgia: St. Mary's, *Baldwin* in 1813 (type, NY) [proliferous, spikelets 3–8-flowered]; dry sandy pine woods, Brunswick, Glynn County, *Pyron* & *McVaugh* no. 260 (B); flat pine barrens, Douglas, Coffee County, *R. M. Harper* no. 685 (G, NY); margin of cypress pond near Chatterton, Coffee County, *R. M. Harper* no. 1451 (G, NY); rather dry pine barrens, Thomas County, *R. M. Harper* no. 1176 (G, NY); pine barrens, Waycross, Ware County, *R. M. Harper* no. 670 (NY). Florida: pineland-prairies, near the Sebastian River, St. Lucie County, *Small, Britton* & *DeWinkeler* no. 9211 (NY); Okeechobee prairie, north of Okeechobee City, *Small, Britton* & *DeWinkeler* nos. 9244 (NY) and 9247 (NY); Lake Okeechobee, *Small* et al. nos. 8217 (NY), 9259 (NY), 4464 (NY), 4335 (NY), 4417 (NY), and 4365 (NY); sandy shore of West Crooked Lake, Eustis, Lake County, *Nash* no. 496 (G, NY, US); in wet ditch, Branchton, *F. S. Blanton* no. 6766 (NY); in moist sandy soil near Orange Dale, St. Johns County, *Moldenke* no. 5245 (NY); moist pine barrens near Jacksonville, *Curtiss* nos. 3074 (G), and 5241 (G, NY); Miami, *Garber* in 1877 (NY); Tampa, *Britton* & *Wilson* no. 51 (NY); Tampa, *Garber* in 1877 (NY); Apalachicola, *Chapman* no. 2302a (G, NY); hard road, Brevard County, *Fredholm* nos. 5752 (G) (as *E. capillacea*), 6070 (G, NY); flatwoods, Alva, Lee County, *A. S. Hitchcock* no. 401 (G, NY) (as *E. Chaetaria*); Jacksonville, *Curtiss* no. 3074 (NY); *Chapman* (NY); without further locality: *Simpson* in 1889 (NY); *LeRoy* (NY); *Leavenworth* (NY); *Underwood* no. 1926 (NY); *Rugel* no. 62 (US). Louisiana: sandy silt on margin of Caddo Lake, near Oil City, Caddo Parish, *Uhler* & *Kubichek*, Sept. 23, 1934 (B).

E. Baldwinii, as Torrey long ago noted, has a superficial resemblance to *E. Chaetaria*. There is much variation in size from wiry robust plants, best developed in sandy soil, to the very dwarf material with slender, few-flowered spikelets, especially abundant in the Everglades of Florida, maintained as *E. prolifera*[1] (Pl. 461, fig. 13) by Dr.

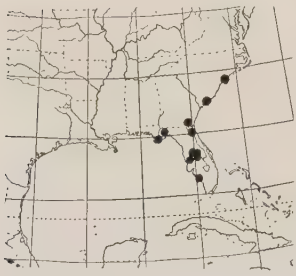
[1] *E. prolifera* Torr. Ann. Lyc. N. Y. iii. 315, 442 (1836). Torrey applied this hopeless *nomen confusum*, which should be rejected, to proliferous plants in general, comprising at least three previously established species. According to my interpretation, his informal account (p. 315) applies mainly to *E. vivipara;* that on p. 442 primarily to *E. microcarpa* var. *Brittonii*. The following entities occupying 4 sheets, named *E. prolifera* by Torrey in his herbarium, are involved:

(1). A plant with soft greenish elongated filiform culms, represented from Milledgeville, Georgia, *Boykin* in 1826 (with achenes), and from North Carolina, *M. A. Curtis;* clearly proliferous *E. microcarpa*, with achenes as in the typical form. The *Boykin* specimen is annotated as the "type" by Dr. Britton.

(2). Coarse plants, resembling *E. albida* but with strong brown roots, and lightly cancellate achenes with brownish bristles. These are *E. vivipara* Link, represented from Charleston, South Carolina, *B. D. Greene*, [with Torrey's annotation "This may be a state of my *Chaetocyperus Baldwinii* & the plant referred to in Baldwin's notes"];

Small. A clear intergradation between the extremes is apparent in the actual type of *E. Baldwinii*, which bears both small and large (3–8-flowered) spikelets.

14. E. VIVIPARA Link. (Pl. 461, fig. 12). Map 12. Erect from a *stout often vertical rootstock* covered by the culm bases of the previous year: *roots coarse, deep brown:* culms 1–3 dm. high, filiform, to 0.5 mm. wide, light green, faintly punctate, deeply striate to sulcate: sheaths yellowish, often purple at base, firm, acute and frequently lightly purple-tipped at the apex: spikelets linear-cylindric, acute, many-flowered, 3–8 mm. long, *usually wholly proliferous* and seldom perfecting fruit: scales appressed, obtuse, 2 mm. long, usually without a keel, dark chestnut on the sides, with whitish hyaline margin, the lowest somewhat larger, erect and appressed to the base of the spikelet: style 3-fid: achene triangular, obovate, 1 mm. long, *dark gray, coarsely reticulate to cancellate:* style-base pyramidal, narrower than the achene, light gray to nearly black (if so with a whitened elevated ridge at the base): bristles reddish-brown, closely retrorse-toothed, nearly equalling the achene.—Hort. Berol. i. 283 (1827); A. Dietrich, Sp. Pl. ii. 87 (1833); Kunth, Enum. ii. 146 (1837); Boeckl. Linnaea xxxvi. 429 (1869–70); Small, Man. 164 (1933). *E. prolifera* Chapman, Fl. S. United States 516 (1860). *E. Curtisii* Small, Man. 165 (1933). *Chlorocharis vivipara* Rikli, Pringsheim Jahrb. xxvii. 564 (1895). North Carolina[1]: Wilmington, *M. A. Curtis* (NY) (type of *E. Curtisii*). South Carolina: Charleston, *B. D. Greene* (hb. *Torrey*, as *E. prolifera*). Georgia: Chesser's prairie, Okefinokee Swamp, *A. N. Leeds* no. 1753 (Ph, B); *F. Harper* no. 539 (Ph, B). Florida: without loc.: *Rugel* no. 61 (NY); *Chapman* (as *E. prolifera* Torr.) (NY). Hillsboro County: Tampa,



Map 12. Range of Eleocharis vivipara.

and from Florida, *Chapman*, with the notation, "This seems distinct from Dr. Boykin's plant." [An achene of *E. vivipara!* is glued on the annotation slip.]

(3). Plants with filiform culms and reddish sheaths, *E. Baldwinii*, from Columbus, Georgia [*Chapman?*]

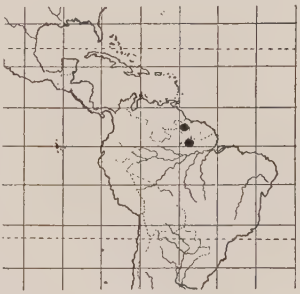
(4). An envelope, containing fruiting spikelets, labeled "Fruit. *Dr. Chapman*, Florida," (evidently the source of the description of *E. prolifera* on page 442), accompanied by drawings with the annotation "Middle Florida. Dr. Chapman," and clearly representing *E. microcarpa* var. *Brittonii* (*E. tenuis* var. *β. Torr.*). On this sheet are also a sterile plant of *E. vivipara* and a proliferous *E. Baldwinii* labeled "no. 347 *Scirpus tenuis ?* Florida. Dr. Chapman."

[1] A recent collection from Princess Anne County, Virginia, *Fernald, Long & Fogg* no. 4817, Sept. 12, 1935 (G, B), "forming the continuous turf at peaty margin of cove, southern end of Lake Joyce," extends the range of *E. vivipara* considerably to the northward.

Curtiss no. 3088 (heavily fruiting) (NY, B). Manatee County: Palma Sola, *Tracy* no. 6959 (NY), 3405 (B). Polk County: (collections by *J. B. McFarlin*, 1931): submerged on sand, Crooked Lake, no. 3378; vic. Lakeland, no. 3405 (B); Dundee Road, vic. Winter Haven, nos. 5091, 5101; east of Lake Reedy, no. 5146; high hammock, Bartow Swamp, vic. Winter Haven, nos. 5758, 5762, 5763 (NY). Lake County: drained swamp, Eustis, *Nash* no. 864 (NY). Duval County: Jacksonville, *Curtiss* nos. 4089 (NY), 4866 (NY). Leon County: Tallahassee, *N. K. Berg* (NY). Franklin County: marshy borders of ponds and streams, Appalachicola, *Biltmore Herb.* no. 3881 (NY).

The species produces mature achenes infrequently, and is often most readily identified by the coarse brown roots proceeding from thickened rootstocks. The relationship is apparently with *E. tortilis*.

Through the kindness of Dr. Gager and Dr. Mattfeld, I have received from Berlin a photograph of the type of *E. vivipara* Link. Dr. Mattfeld writes that the specimen is very unsatisfactory since it has only a single spikelet containing immature flowers. By Dr. Kükenthal, it has been found identical with *E. vivipara* Kunth, based on a *Beyrich* collection from Carolina. Judging from this photograph, Link's fragmentary specimen, originating from North America and grown at the Berlin Botanic Garden, has much the appearance of *Curtiss* no. 4089 (distributed as *E. prolifera* Torr.).



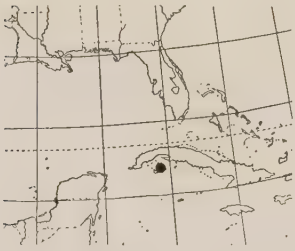
MAP 13. Range of ELEOCHARIS SUBFOLIATA.

E. Curtisii rests on a single dwarf specimen in the herbarium of the New York Botanical Garden. When examined by me in 1930 this specimen had several spikelets, but at the present writing only a fragmentary spikelet remains. The achene preserved by Dr. Small shows the same reticulated surface as in *E. vivipara* and I have no hesitation in treating *E. Curtisii* as a synonym.

15. E. SUBFOLIATA C. B. Clarke (PL. 461, FIG. 5). MAP 13. *Cespitose annual* with fibrous roots: culms capillary, rigid, 3–6 cm. long, punctate, compressed or obscurely quadrangular-sulcate: sheaths brown to purplish, somewhat inflated at the apex, *often splitting into fibrous segments:* spikelets ovate or elliptic, 3–6 mm. long, 6–10-flowered: scales keeled, subdistichous, rigid, acute, 2 mm. long, brown, greenish on the keel and with a scarious margin: style 3-fid: achene trigonous, obscurely costulate, 1 mm. long, elliptic-obovate, *brownish-gray, iridescent, lightly cancellate:* style-base small, pyramidal, grayish,

½ as wide as the achene: bristles brown, rudimentary to nearly equalling the achene.—Kew Bull. Add. Ser. viii. 22 (1908). *E. spadicea* C. B. Clarke (nomen confusum) Kew Bull. Add. Ser. viii. 21 (1908). —Brazil: ad cataractas fl. Aripicuru [a northern tributary of the R. Trombetas], Prov. Pará, *R. Spruce*, Dec. 1849 (G, K, NY). British Guiana: Drake (K, S) (as *E. Wrightiana*, det. Clarke).

The above description and figure are based upon the fertile plants represented in Spruce's collection in the Gray Herbarium, the species as described by Clarke resting mainly upon aberrant, sterile plants with coarser culms and elongated spikelets (reaching 10 mm. in length) undoubtedly the same as a specimen in the herbarium of the New York Botanical Garden. Clarke also cited under *E. subfoliata Gardner* no. 2753, from Piauhy, Brazil, a collection which I am treating as questionable *E. nigrescens* (see discussion under that species). Gardner's plant has no real connection with *E. subfoliata*, although the elongated apex of the sheath (superficially resembling the shredded apex in Spruce's aberrant specimen) may have contributed somewhat to Clarke's selection of the specific name. *E. subfoliata* has much of the outward appearance of *E. minima*, but the culms are sparser and more rigid, and the brownish-gray achenes are distinctive in their narrowed summit, deep reticulation which one might call subcancellate, and peculiar iridescence. In the Drake specimen cited, the culms are 10–15 cm. long. To *E. subfoliata* also probably belong the sterile plants from British Guiana represented by *Jenman* no. 4770 (K) and *Jenman* no. 6114 (NY), the latter determined by Boeckeler as *E. nana*.



Map 14. Range of Eleocharis grisea.

A sterile collection by *Parker* (K) from Demerara [British Guiana] with reddish-brown spikelets, labeled by C. B. Clarke as "*E. spadicea*" probably belongs here, but the only reference following the wholly inadequate description of *E. spadicea* is "Chaetocyperus albibracteatus Nees! in Nov. Act. Nat. Cur. xix. Suppl. I (1843), p. 95, partim." Upon turning to that publication, one finds merely the secondary citation of a specimen "In Guiana, Hook. Herb. Lindl." the description otherwise being based wholly on the high Andean plant known as *E. albibracteata*. Thus, if *E. spadicea* is held to have been adequately published (which I do not think is the case), the *Parker* specimen may perhaps represent the type.

16. E. GRISEA Kükenthal (Pl. 465, FIG. 5). MAP 14. Culms few from a *slender creeping rhizome*, 8–10 cm. high (*0.5–1 mm. wide* in dried material), *flaccid*, compressed, obscurely sulcate and lightly punctate: sheaths light brownish-purple, the apex marcescent: spikelets ovate, 3–4 mm. long, 3–6-flowered: scales ovate-oblong, obtuse, stramineous, brownish on the sides, with a hyaline margin: style 3-fid: achene trigonous, 1 mm. long, *greenish-gray*, obovate-elliptic, prominently angled, *cancellate* with *small circular pittings:* style-base depressed-pyramidal, gray: bristles white, rudimentary, from a cup-like base.—Fedde, Rep. Spec. Nov. xxiii. 194 (1923).—CUBA: known only from a single collection, sandy pine lands, Westport, Isle of Pines, *Ekman* no. 12,077 (NY, S).

E. grisea appears to be most closely related to *E. alveolata.*

17. E. MINUTISSIMA Britton (Pl. 462, FIG. 13). Densely cespitose. Culms capillary, punctulate, 1–3 cm. high, and somewhat thickened at base: roots whitish, rather coarse: spikelets ovoid, 1–2 mm. long, loosely 3–7-flowered: scales spreading, ovate, strongly keeled, green to castaneous with hyaline margins: achenes 0.5! mm. long, oblong, obovoid, iridescent, white to gray, obtusely trigonous, cancellate, the depressions tending to be horizontal as in series *Aciculares;* bristles none: style-base gray, low triangular-apiculate, ½ as wide as the achene.—Mem. Torr. Club xvi. 60 (1920).—CUBA: border of a lagoon near Pinar del Rio, *Britton, Britton & Gager* no. 6965 (NY).

This remarkable little species has a superficial resemblance to the smallest material contained in *C. Wright's* collection no. 3370, but the few-flowered spikelets and the peculiar markings of the achene separate it out immediately. I have seen no other material resembling it. Though some of the horizontal sculpture of the achene-surface simulates the markings of the *acicularis* group, the general aspect of the achenes and the punctate character of the culms leaves no doubt that the species belongs to the *Tenuissimae.*

18. E. TORTILIS (Link) Schultes (Pl. 464, fig. 4) MAP 15. Perennial, *forming compact clumps: rootstocks* (when present) vertical, branched, *subligneous*, roots firm, white, thickened: culms light green, *twisted*, 2–5 dm. tall, sharply triangular: sheaths stramineous, acute at apex: spikelets ellipsoid to ovoid, 4-8 mm. long, few to many-flowered: scales 2–3 mm. long, obtuse, cartilaginous, yellow, prominently marked with dark chestnut on the sides, the margin hyaline: style 3-fid: achene 2 mm. long, bluntly to sharply trigonous, *deeply cancellate*, olivaceous to gray: 1/3 of its length occupied by the *pyramidal-subulate style-base:* bristles equalling or exceeding the achene, reddish brown, retrorsely toothed.—Mant. ii. 92 (1824); Kunth, Enum. ii. 144 (1837); Boeckl. Linnaea xxxvi. 441 (1869–70); Robinson & Fernald in Gray Man. ed. 7. 183, f. 252 (1908); Britton & Brown, Ill. Fl. 253,

fig. 589 (1896). *Scirpus tortilis* Link in Sprengel, Schrader & Link, Jahrb. i.[3] 78 (1820).[1] *Eleocharis simplex* Torr. Ann. Lyc. N. Y. iii. 306 (1836), not *Scirpus simplex* Ell. Sk. Bot. South Carolina & Georgia i. 76 (1816) nor *Eleocharis simplex* A. Dietr. Sp. Pl. ii. 78 (1833); Steudel, Syn. Cyp. 75 (1855); Britton & Brown, Ill. Fl. ed. 2, i. 316, f. 773 (1913); Small, Man. 164 (1933). *E. camptotricha* Mohr, Contrib. U. S. Nat. Herb. vi. 399 (1901).—Swamps and bogs on the coastal plain, Long Island to Texas.—New York: Rockville Center, *Bicknell* in 1903 (Alb, NY). New Jersey: Swedesboro, *Lippincott* (NY); Cold Spring, *O. H. Brown* (NY) and *Mackenzie* no. 6997 (NY); South Vineland, *Bassett* & *Long* in 1923 (NY); Cape May County, *Killip* no. 2370 (G); Dias Creek, *Van Pelt* in 1909 (G, NY). Delaware: Georgetown, Sussex County, *Britton* in 1908 (NY); *Van Pelt* in 1908 (G). Maryland: Salisbury, *Commons* in 1863 (G, NY); Salisbury, *Canby* in 1864 (G), 1866 (NY) and 1867 (NY); Ocean City, *Chickering* in 1878 (NY). Virginia: Stafford, *J. Bright* no. 1225 (D); Blackwater River, *Fernald* & *Long* no. 3764 (G). North Carolina: Southern Pines, *Blankinship* in 1895 (G); *M. A. Curtis* in 1834 (NY). South Carolina: Aiken, *Ravenel* (G, NY); Kershaw, Lancaster Co., *House* no. 2617 (NY). Georgia: wet woods, DeKalb Co., alt. 950 ft., *Harper* no. 197 (G, NY); Thomson, McDuffie Co., *H. H. Bartlett* no. 1447 (D). Florida: Aspalaga, *Chapman* (NY). Alabama: borders of ponds, ditches, Mobile, *Mohr* nos. 8, 10 (NY) (as *E. camptotricha*). Mississippi: Ocean Springs, *Tracy* no. 4818 (G); Biloxi, *C. F. Baker* in 1897 (NY).

Map 15. Range of Eleocharis tortilis.

[1] Through the kindness of Miss Ethelyn Tucker, Librarian of the Arnold Arboretum, I have a copy of Link's description in this rarely accessible publication: "*Scirpus tortilis* von Bosc aus Nord-Amerika, culmo triquetro spiraliter torto: foliis culmi similibus? spica terminali solitaria ovata ebracteata, squamis obtusis, semine triquetro setis cincto, stylo basi dilatato persistente. Ist also eine *Eleocharis* Br." As in other species published by Link in this journal (cf. Fernald, Rhodora xxxv. 260 (1933)), there has been confusion in citing the author of *Scirpus tortilis*, based on a specimen in the Willdenow Herbarium collected by Bosc in Carolina. Schultes, perhaps the only source of these names to the editors of Index Kewensis, had copied Link's description, adding incorrectly the citation, "*Scirpus tortilis* Bosc. apud Link, Jahrb. 3, p. 78"; and Kunth's revised description (1837) rested likewise on "Scirpus tortilis *Willd. herb.* no. 1174. *Link. Jahrb.* 3. 78. Scirpus spiralis *Bosc. ined.*" These citations were the source of the ambiguous names "*Scirpus tortilis* Willd." and "*Scirpus spiralis* Bosc." listed in Index Kewensis. Link was correctly named as author by Britton (1889).

Eleocharis, series Tenuissimae (habit × ½, spikelets × 2½, achenes × 20). Fig. 1, E. minima (*E. oropuchensis*). Fig. 2, E. glauca. Fig. 3, E. subcancellata. Fig. 4, E. Brainii. Fig. 5, E. subfoliata. Fig. 6, E. Naumanniana. Fig. 7, E. caespitosissima. Fig. 8, ? E. nigrescens. Fig. 9, E. amazonica. Fig. 10, E. Chaetaria. Fig. 11, E. retroflexa. Fig. 12, E. vivipara. Fig. 13, E. Schweinfurthiana. Fig. 14, E. nigrescens (*E. Perrieri*).

ELEOCHARIS, SERIES TENUISSIMAE (habit × ½, spikelets × 2½, achenes × 20). FIGS. 1–3, E. MINIMA, var. BICOLOR: FIG. 1, *E. savannarum;* 2, *E. bicolor;* 3, *E. uncialis*, trigonous achene. FIG. 4, E. BARROSII. FIGS. 5–9, E. NIGRESCENS: FIG. 5, from Cuba; 6, *E. Hildebrandtii;* 7, TYPE SPECIMEN; 8 and 9, var. MINUTIFLORA. FIG. 10, E. TRILOPHUS. FIG. 11, E. ANCEPS. FIG. 12, E. NANA. FIG. 13, E. MINUTISSIMA. FIG. 14, E. MICROCARPA (*E. cubensis*).

Louisiana: wet springy places in sandy fields, Shreveport, *Cocks* no. 3617 (NY); Chopin, Natchitoches Parish, *E. J. Palmer* no. 7994 (as *E. tuberculosa*) (C); *J. Hale* (G). Texas: Colmesniel, *Plank* in 1892 (NY); sandy bogs, Oakwood, Leon Co., *E. J. Palmer* no. 13413 (NY); Liberty Co., *C. Wright* (G); Hempstead, *E. Hall* no. 699 (NY, Pom) (as *E. tuberculosa*); *Hall* no. 536 (NY).

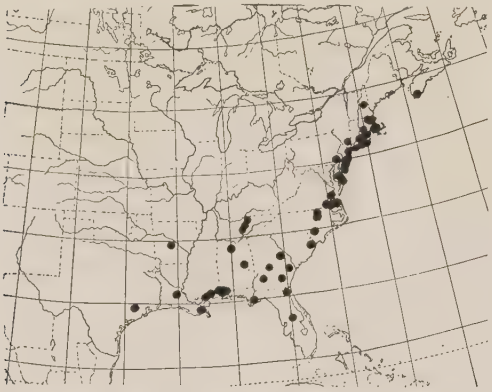
Torrey, basing his description of *E. simplex* almost entirely upon the *Curtis* specimen from North Carolina, did so with some doubt. His determination was followed by a query and the notation "Differs a little from Elliott's plant." Had he examined the Elliott specimen in his herbarium more carefully—providing the optical equipment of his day was equal to the task—Torrey would have found that the specimen, although in young condition, was exactly what he was describing as *E. tuberculosa* var. β. Through the kindness of Mr. E. Milby Burton, director of the Charleston Museum, I have seen fragments of Elliott's actual type of *Scirpus simplex* [from Georgia], with the accompanying data: "*Scirpus simplex* mihi. Hab. Ogeechee in udis. Flor." It is *E. tuberculosa* var. β Torrey, identical with the Elliott specimen in Torrey's herbarium. Mr. Burton also has kindly sent me a fragment of "*Scirpus tuberculosus*" from the Elliott collection, with the annotation "hab. in udis subsalis Flor. Ma-Aug.," a specimen which proves to be *Eleocharis albida*, just as it is represented in the Torrey herbarium.[1]

Elliott described *S. simplex* as having "scales with midrib scarcely distinct"; *S. tuberculatus* with "midrib green." From these two characteristics it is evident that Elliott's specimens had been interchanged and that Elliott himself was the source of confusion, judging from the note added by Baldwin to a specimen of *Scirpus tuberculosus* var. β, "This is certainly a variety of the *tuberculosus*, agreeing in everything except size. Mr. E. returned it to me for his *Simplex*. There must be some mistake in this business." It may also be noted that "*Scirpus simplex* Ell." collected by Beyrich at Charleston, S. C., in 1833 (K), the type collection of *E. simplex* Kunth, is *E. albida*. In view of the general confusion and the inadequacy of Elliott's de-

[1] Accompanying the specimen [hb. Torrey] is the annotation, in Torrey's hand, "This is not *S. tuberc.* but my *El. floridana.*" Of *E. albida* (l. c. p. 304) Torrey notes "This species resembles at first sight *E. capitata* [represented only by *E. flaccida!* in Torrey's herbarium], but it differs in its somewhat angular and dull nut, 3-cleft style, and much more coriaceous scales." There is no further mention of *E. floridana*, based on Dr. Ingalls' collection of *E. albida* from Barataria, Louisiana [hb. Torrey]; neither has this name nor *Scirpus floridanus* Michx., cited by Kunth in synonymy of *Scirpus pusillus* Vahl, ever come to light.

scription, it would be most unsatisfactory to overthrow the well-established name, *E. albida* Torr. Therefore *E. simplex* should remain a synonym of typical *E. tuberculosa* (Michx.) R. & S.

19. E. TUBERCULOSA (Michx.) R. & S. (Pl. 464, fig. 3). Map 16. *Coarse* cespitose plants with short vertical rootstocks, or often with only soft fibrous bases: culms *flattened*, glaucous-green, 1.5–8 dm. high: sheaths stramineous to green, closely appressed, acute at the apex: spikelets many-flowered, broadly ovoid to ovoid-lanceolate, 5–15 mm. long: scales cartilaginous, stramineous with narrow green midrib and faint to dark brown coloration on the sides: achene body 1.5 mm. long, stramineous to olivaceous, trigonous, *deeply cancellate: style-base pallid, mitriform*, 1.0–1.5 mm. long, obtuse to acute, often 3-lobed at base, *usually equalling* (occasionally exceeding)[1] *the achene-body* in size: bristles nearly equalling the style-base, light brown to ferrugineous.—Syst. ii. 152 (1817); Torr. Ann. Lyc. N. Y. iii. 307 (1836) (as var. β); Kunth, Enum. ii. 145 (1837); Chapman, Fl. Southern U. S. 515 (1860); Boeckl. Linnaea xxxvi. 446 (1869–70); Britton & Brown, Ill. Fl. i. 253, fig. 590 (1896); Robinson & Fernald in Gray, Man. ed. 7, 183, fig. 253 (1908). *Scirpus tuberculosus* Michx. Fl. Bor.-Am. i. 30 (1803). ?*S. tuberculatus* Elliott, Sk. Bot. So. Car. & Georgia i. 78 (1816). *Rhynchospora monostachya* Steudel, Syn. Cyp. 140 (1855). *Chlorocharis tuberculosa* Rikli, Pringsheim Jahrb. xxvii. 564 (1895).—Sandy shores and bogs, chiefly on the coastal plain, Nova Scotia and New Hampshire to Arkansas and Texas; extending inland to northern Alabama and the Cumberland Plateau of Tennessee. Nova Scotia: wet sandy beach of Harper Lake, Shelburne County, *Fernald & Long* no. 23381 (NY) and Plant. Exsicc. Gray. no. 439 (B, NY). New Hampshire: White Lake, Tamworth, *Pease* no. 19242 (Alb, G). Massachusetts: Manchester, *Oakes* (NY); Tewksbury, *B. D. Greene* (NY); in sphagnum overlying sand, margin of Round Pond, Tewksbury, *Fernald & Eames* (Pl. Exsicc. Gray. no. 139) (Alb, NY); wet sphagnous clearing near



Map 16. Range of Eleocharis tuberculosa.

[1] As in the achene examined from Michaux's type, and also fig. 253 in Robinson & Fernald, Gray, Man. ed. 7. Similar examples occur in Pl. Exsicc. Gray no. 139.

Chebacco Lake, Essex County, *Fernald, Hunnewell* & *Long* no. 8894 (NY); Swain's Pond, Melrose, *Svenson* in 1916 (B); Snipatuit Pond, Rochester, Plymouth County, *St. John* & *Hunnewell* in 1916 (NY); Ezekiel Pond, Plymouth, *Svenson* in 1928 (B). RHODE ISLAND: South Kingston, *Olney* no. 307 (NY); *Thurber* (NY). CONNECTICUT: Groton, *Bissell* in 1901 (NY); Preston, *Svenson* no. 4551 (B); New Haven, *Winton* in 1887 (NY). NEW YORK: Mt. Vernon, *Bicknell* no. 1006 (NY); Woodmere, *Bicknell* no. 1007 (NY); Ronkonkoma, *Ferguson* nos. *486 (NY, US) and *3101 (NY); Oakdale, *Ferguson* no. 7772 (NY); Montauk, *Ferguson* no. 579 (NY) (scales very dark); Central Islip, *Ferguson* no. *3055 (NY); Meadow Brook, *Ferguson* no. 434 (NY); Erastina, Staten Island, *Hollick* & *Britton* in 1888 (NY). NEW JERSEY: Egg Harbor, *Brinton* in 1889 (NY); Manchester [Lakehurst], *Porter* in 1870; *Knieskern* (NY); *Torrey* (NY); Lakewood, *Mackenzie* no. 5184 (NY); Barnegat River, *Mackenzie* no. 3697 (NY); Shark River, *Mackenzie* no. 8016 (NY); Atco, *Crawford* & *Bliss* in 1927 (NY); Pleasant Mills, *Leggett* in 1874 (NY); Bennett, *Mackenzie* no. 6571 (NY); Dennisville, *Mackenzie* in 1919 (NY); Cold Spring, Cape May, *Pennell* no. 1814 (NY). PENNSYLVANIA: on Potsdam sandstone, Willow Grove, Montgomery County, *MacElwee* no. 835 (NY). DELAWARE: upland meadows, Ellendale, *Canby* (NY); Georgetown, Sussex County, *Britton* in 1908 (NY). VIRGINIA: Cape Henry, *Leonard* & *Killip* no. *237 (B); near Virginia Beach, Princess Anne County, *Heller* no. *1164 (NY); Princess Anne County, **Heller* in 1893 (NY); west of Williamsburg, *Grimes* no. *3191 (NY); wet peaty clearings in woods of *Pinus serotina*, south of Grassfield, Norfolk County, *Fernald* & *Long* no. 3762 (B, G). NORTH CAROLINA: Margarettsville, Northampton County, *Heller* no. *1164 (!) (NY); Weldon, **Williamson* in 1900 (NY); wet sandy soil, Clarkton, *Biltmore Herb.* no. *2301a (NY). SOUTH CAROLINA: very common in damp soil, Santee Canal, **Ravenel* (NY); ditch in wet pine barrens, south of Socastee, Horry County, *Griscom* no. *16432 (NY). GEORGIA: pine barren, Thomson, McDuffie County, *H. H. Bartlett* no. 933 (D); swamp 14 miles south of Hawkinsville, *Svenson* no. *6980 (B); near Satilla River, Lulaton, Brantley County, *Pyron* & *McVaugh* no. 313 (B); moist pine barrens, Leslie, Sumter County, *R. M. Harper* no. 640 (B, NY); Americus, *Harper* in 1897 (B, NY). FLORIDA: Jacksonville, *Curtiss* nos. *3096 (B, NY), *4090 (NY), and *4865 (NY); edge of cypress swamp, Eustis, Lake County, *G. V. Nash* no. *1688 (NY); Middle Florida, **Chapman* (TYPE of var. β Torrey, NY); Appalachicola, *Chapman* no. *2301b (NY). TENNESSEE: muddy margin of a pond, Crossville, Cumberland County, *Svenson* no. *6935 (B); bog east of Altamont, Grundy County, *Svenson* no. *7339 (B); bog, Clark Range, Fentress County *J. K. Underwood* & *A. J. Sharp* no. *2850 (B, T). ALABAMA: Auburn, Lee County, *Baker* in *1897 (NY) and *1898 (NY); Gateswood, *Tracy* no. *8663 (NY); Mobile, **Baker* in 1897 (NY); Mobile, *Tracy* no. 6960 (NY); Spring Hill, *Bush* no.

*69 (NY); wet places, Cullman County, **Eggert* in 1897 (NY); northern Alabama, **Buckley* (NY). Mississippi: Ocean Springs, *Tracy* no. *4818 (NY); moist pine barrens near Ocean Springs, *Kearney*, in 1896 (NY); Scranton, Jackson County, *Pollard* no. 1192 (NY); Biloxi, Harrison County, *Tracy* nos. 1367 (NY) & 3593 (NY); Biloxi, **Baker* in 1897 (NY). Arkansas: near Little Rock, **Hasse* in 1886 (NY). Louisiana: New Orleans, **Ingalls* (NY); shallow ponds, *Mackenzie* no. 433 (NY); rare in wet pine woods, Alexandria, *C. R. Ball* no. *516 (NY); Covington, *Arsène* no. *11250 (B, US). Texas: Edna, *Plank* in 1892 (NY).

Through the kindness of Professor Humbert, of the Muséum National d'Histoire Naturelle, Paris, I have examined an achene from the Michaux collection, which exhibits the divergent bristle-teeth associated with var. β Torrey. Typical *E. tuberculosa*, which occurs on Long Island and from Virginia southward, I have therefore marked with an asterisk (*) in citation of specimens. The plants with downwardly-barbed bristles, in conformity with analogous variations in *Rynchospora* (see Rhodora xxxvii. 401 (1935)), should called

Forma **retrorsa** forma nov. (Pl. 464, fig. 1). Setis retrorsum hispidis.—*E. tuberculosa* Torr. Ann. Lyc. N. Y. iii. 307 (1836); Robinson & Fernald in Gray, Man. ed. 7, 183, fig. 253 (1908). Plant. Exsicc. Gray. no. 139 (coll. *Fernald* & *Eames* in 1909 (type in Gray Herb.)).
The plant with smooth bristles should be called:

Forma **pubnicoensis** (Fernald) n. comb. (Pl. 464, fig. 2).—*E. tuberculosa* var. *pubnicoensis* Fernald, Rhodora xxiii. 233 (1921).—Nova Scotia: Pubnico Lake, Yarmouth County, *Fernald, Long* & *Linder* nos. 20163 (G, NY) and 20164 (G, NY).

E. tuberculosa, unique in the remarkable development of the style-base, often takes complete possession of dried-out pond-holes on the coastal plain. Northward the bristle-teeth are predominantly downward-barbed. In general the southern plants tend to be robust, often with acute spikelets, but neither these characteristics nor the color of the spikelets appear to be significant.

20. Eleocharis Chaetaria R. & S. (Pl. 461, fig. 10). *Fibrous-rooted annual*, often proliferous, culms light green, 5–15 cm. high, somewhat rigid, punctate, obscurely quadrangular-sulcate: sheaths reddish, marcescent, scarious and somewhat obtuse at the apex: spikelets ovate, 2–4 mm. long, about 3–10-flowered, *scales spreading in fruit:* scales obtuse, keeled, with greenish midrib, chestnut sides, and broad scarious margin: style 3-fid: achene trigonous, 1.0–1.3 mm. long, urceolate, costulate on the angles, *deeply cancellate*, stramineous to dull gray: style-base pyramidal, as broad as the achene, *blunt at the apex*, dull brown, *the 3-crested base decurrent on the angles of the*

achene.—Syst. ii. 154 (1817); Kunth, Enum. ii. 140 (1837); Boeckl. Linnaea xxxvi. 428 (1869–70); C. B. Clarke in Hook. Fl. Br. Ind. vi. 629 (1893). *Cyperus setaceus* Retz. Obs. v. 10 (1789); Willd. Sp. i. 269 (1798); Vahl, Enum. ii. 305 (1805); Roxb. Fl. Indica, ed. Cary & Wallich, i. 190 (1820); not *Eleocharis setacea* R. Br. Prod. Fl. Nov. Holl. 225 (1810). *Scirpus pygmaeus* Lam. Ill. i. 139 (1791). *Scirpus Chaetarius* Spreng. Syst. i. 203 (1825). *Chaetocyperus Limnocharis* Nees in Wight, Bot. Ind. 96 (1834). *Chaetocyperus setaceus* Nees, Linnaea ix. 289 (1834) (nomen) and in Mart. Fl. Bras. ii[1]. 94 (1842).—India and Ceylon to the Philippine Islands. BRITISH INDIA: in graminosis humidiusculis frequens Calcuttae, *Koenig* (TYPE in hb. Univ. Lund); Silhet, hb. *Hooker* & *Thompson* (G, K, NY); Punjab, Dalhousie, Chamba Road, *R. R. Stewart* no. 2266 (NY); East Bengal, hb. *Griffith* no. 6210 (NY). CEYLON: Thwaites (G); Kalugammane district, *Silva* no. 292 (NY); hb. *Wight* no. 2895 (NY). INDO-CHINA: Annam, Nha-trang, *C. B. Robinson* no. 1219 (K, NY); Annam, *J.* & *M. S. Clemens* nos. 4079 (NY), 4165 (NY); Cambodia, *Godefroy-Lebocuf* no. 362 (K); Quanbi, Tonkin, *Balansa* no. 182 (K). MALAY PENINSULA: Selangor, *Ridley* no. 13397 (K); Singapore, *Hullett* in 1894 (K); Kelautau, *Kola Bakru* in 1917 (K). PHILIPPINE ISLANDS: Laguna, Prov. Luzon, *Curran* no. 19276 (NY) and *Ramos* no. 10049 (NY); Luzon, *Elmer* no. 14558 (G); Baguio, prov. Benguet, *R. S. Williams* no. 1231 (NY); Island of Polillo, *C. B. Robinson* no. 9029 (NY).

The type (*Cyperus setaceus*) sent to Retzius by Koenig, and consisting of a single small plant, was examined by me through the kindness of Mr. C. E. C. Fischer of Kew, who at that time had the specimen on loan from Lund University.[1] *E. Chaetaria* was likewise described from India by Lamarck (1791) (coll. *Thunberg*) as *Scirpus pygmaeus.* By many authors the corresponding American species, *E. retroflexa* Poiret, has been included with *E. Chaetaria,* but the two are clearly distinct, *E. Chaetaria* having a much lower and blunter style-base, and larger and deeper markings on the achene.

21. **E. Brainii** n. sp. (PL. 461, FIG. 4). Annua cespitosa nana, radice fibrosa: culmis 1–3 cm. longis, spongiosis, obscure sulcatis: vaginis albidis, scariosis, apice acuminatis: spiculis 1–2 mm. longis, late ovatis, 4–8-floris, glumis in fructu divaricatis, 1 mm. longis, acutis, in carina viridibus, latere rubris, margine scariosis: stylo 3-fido: achaenio 0.6 mm. longo, trigono, *truncato, nitidulo-griseo vel albescente, cancellato:* stylo-basi fusca, *multo depressa,* in medio et in angulis quoque *paullo apiculata.*—*E. Chaetaria* C. B. Clarke in Dyer, Fl. Trop. Africa viii. 408 (1902), in part.—RHODESIA: very wet vly on granite sand, alt. 4800 ft., Salisbury District, *C. K. Brain* no. 8963

[1] In this collection was also the type of *Scirpus atropurpureus,* represented by small characteristic plants, identical with *Eleocharis atropurpurea* as I have treated the species.

(TYPE in Herb. Kew, fragment (G)). NILE LAND: Seriba Ghattas, Djur, *Schweinfurth* no. 2583 (G). MOZAMBIQUE: regio orientalis, *Schlechter* no. 12232 (K).

Differs from *E. Chaetaria* in its low stature, erect but spongy culms, and in the smaller achenes, which have the style-base not decurrent at the angles. It is questionable whether *E. Chaetaria* actually occurs in tropical Africa.

22. E. SCHWEINFURTHIANA Boeckl. (PL. 461, FIG. 13). Erect from a vertical, *slightly ligneous rhizome:* culms 4–10 cm. high, light green, punctate, compressed to terete, irregularly sulcate: sheaths yellowish, marcescent: spikelets ovate, 2–3 mm. long, many-flowered: scales 1 mm. long, scarcely keeled, yellowish throughout, obtuse to slightly emarginate: style 3-fid: achene 0.7 mm. long, trigonous, the *angles scarcely costulate,* stramineous to light brown, faintly brown-striolate: style-base brown, short-pyramidal, apiculate, the *basal angles slightly overhanging the achene:* bristles light brown, obscurely toothed, *half as long as to nearly equalling the achene.*—Flora, 1879. 562 (1879). *E. microcarpa* C. B. Clarke in Durand & Schinz, Consp. Fl. Afr. v. 599 (1895), in Thistleton-Dyer, Fl. Trop. Afr. viii. 410 (1902), and in Philippine Journ. Sci. Bot. ii. 91 (1908); not Torr. *Heleocharis Perrieri* Chermezon, Bull. Soc. Bot. France lxxiii. 554 (1926) and lxxv. 287 (1928), in part.—Tropical Africa, Madagascar, Philippine Islands. NILE LAND: Seriba Ghattas, Djur [British East Africa], *Schweinfurth* no. 1949 (G, K, cotype). MADAGASCAR: Majunga, *Perrier de la Bâthie* no. 17282 (B). PHILIPPINE ISLANDS: Central Luzon, *Loher* no. 5193 (K).

This comparatively rare Old-World species stands, I believe, between *E. nigrescens* and *E. anceps.*[1] In outward aspect and in minute details of the achene, *Perrier de la Bâthie* no. 17282 and *Loher's* specimen from the Philippines appear identical with the type collection of *E. Schweinfurthiana.*

23. E. CAESPITOSISSIMA Baker (PL. 461, FIG. 7). *Dwarf,* densely cespitose annual (?), often stoloniferous: *culms 1–5 cm. long,* filiform, quadrangular-sulcate: sheaths green to purplish: spikelets obovate to oblong, 1–2 mm. long, 3–6-flowered: scales obtuse, deep brown to greenish, the lowermost prominently green-keeled: style 3-fid: achene narrowly obovate, trigonous, 1 mm. long, *light greenish-gray,* a greenish reticulum with dark brown background frequently appearing on mature achenes: style-base gray, acute-pyramidal, a little more than half as wide as the achene: *bristles* equalling the achene, white to

[1] Apparently intermediate between *E. Schweinfurthiana* and *E. anceps* is *Heleocharis Helenae* Buscalioni & Muschler in Engler, Bot. Jahrb. xlix. 461 (1913), from Banguela-See in northern Rhodesia, a species with compressed culms 8–12 cm. long and achenes "subtilissime striata," differentiated by the authors from *E. Schweinfurthiana* by "reichblühenderen Aehren und häutig gerandeten Squamae."

faintly brown-tinged, retrorsely toothed, *forming a whitish cup at the base*.—Journ. Linn. Soc. Bot. xxi. 450 (1886); Chermezon, Bull. Soc. Bot. France ser. 5, iv. 286 (1928), and Cat. Pl. Madagascar (*Cyperaceae*) 36 (1931). *E. subvivipara* C. B. Clarke in Durand & Schinz, Consp. Fl. Africa v. 601 (1895), not Boeckl.—Known only from MADAGASCAR: *Baron* no. 2242 (TYPE, K); *Perrier de la Bâthie* nos. 2689 (B) and 17953 (B).

For specimens of this rare species I am greatly indebted to Professor Chermezon.

24. E. ANCEPS Ridley (PL. 462, FIG. 11). Loosely cespitose annual with fibrous roots: culms 4–20 cm. high, *flattened (0.5–1.5 mm. wide when dry)*, sulcate, inconspicuously punctate: sheath purplish at base, apex firm, obtuse to somewhat acuminate: spikelets many-flowered, elliptic to elongate, 3–12 mm. long, 2–3 mm. wide: scales ovate, obtuse to emarginate, membranous, keeled, dull yellowish-green, often with brownish sides: style 3-fid: achenes trigonous, obovate, slightly narrowed at the summit, 0.8 mm. long, costulate, white with faint brown striolation: style-base depressed, pyramidal, apiculate in the center, grayish brown, half the width of the achene: bristles none.—Trans. Linn. Soc. ser. 2, Bot. ii. 148 (1884); C. B. Clarke in Durand & Schinz, Consp. Fl. Africa v. 596 (1895) and in Thistleton-Dyer, Fl. Trop. Africa viii. 410 (1902).—Tropical Africa.

The above description in based on a specimen obtained by *Mann* from West Tropical Africa (1859–63) no. 891 (without further locality) in the Gray Herbarium, a plant somewhat larger than Ridley described from the Welwitsch collection made in the vicinity of Pungo Andongo, Angola. *Chevalier* no. 2454 (K) from Kora Koro, Sudan, also belongs under this species.

25. E. TRILOPHUS C. B. Clarke (PL. 462, FIG. 10). Cespitose annual: *culms proliferous*, 3–6 cm. long, flaccid, *recumbent*, quadrangular: spikelets 2 mm. long, ovoid, 4–7-flowered: scales dark shining reddish-brown, the two lower scales larger and green-striate: style 3-fid: achene 1 mm. long, narrowly obovoid, white, strongly costulate, with a faint, somewhat pearly, reticulation: style-base depressed-pyramidal, the *angles decurrent on the shoulders of the achene:* bristles olive-gray, half as long as the achene.—C. B. Clarke in Thistleton-Dyer, Fl. Trop. Africa viii. 409 (1902) and in Durand & Schinz, Consp. Fl. Africa v. 601 (1895) (nomen).—UPPER GUINEA: Senegal, *Roger* no. 113 (TYPE, K).

Roger's specimen, which I examined at Kew (mixed with *E. atropurpurea*) bears the information: "Juncus. Plante annuale qui croit sur les terres humides, après d'inondation."

26. E. NAUMANNIANA Boeckl. (PL. 461, FIG. 6). *Much-branched proliferous aquatic* up to 4 dm. long: culms capillary, soft, olivaceous,

flattened to trigonous, neither striate nor sulcate: sheaths membranous, scarious and marcescent: spikelet usually proliferous, 3 mm. long, *linear* in flower, the *2 large scales* spreading in fruit: scales 3 mm. long, greenish, scarious except the green median nerve which is produced into a long acuminate tip: achene trigonous, elliptic-obovate, conspicuously *narrowed at base and constricted at apex*, 1.5 mm. long, *iridescent gray, cancellate*, lightly costate: style-base very narrow, subulate-pyramidal, dark brown: bristles none.—Engler, Jahrb. v. 92 (1884); C. B. Clarke in Durand & Schinz, Consp. Fl. Africa v. 599 (1895) and in Thistleton-Dyer, Fl. Trop. Africa viii. 411 (1902). *E. Testui* Chermezon, Bull. Soc. Bot. France lxxvii. 276 (1930).—Africa: Monrovia, Liberia, Aug. 1874 (coll. *Dr. Naumann* on the "Gazelle" Expedition); French Guinea, *Caille* no. 14957 (K, fragment in B); Gabon, *Le Testu* no. 5816 (cited by *Chermezon*).

Mr. Hutchinson has kindly given me a portion of Caille's collection, from which I have drawn the above description. From detailed comparison with Boeckeler's account, I am confident that Caille's plant is the same as *E. Naumanniana*. The structure of the thread-like culms and the peculiar one-flowered spikelets are decidedly different than in other species of *Eleocharis*, and have a strong resemblance, as C. B. Clarke has noted, to *Scirpus submersus* C. Wright. Boeckeler (l. c.) in the same way compares the form of *E. Naumanniana* with the proliferating masses of the Brazilian *E. capillacea*. With these comparisons in mind and Chermezon's description and similar comment on *Helcocharis Testui*, a plant "très curieuse . . . un épillet terminal unique, . . . puisqu' il est uniflore," I do not hesitate to place that species also under *E. Naumanniana*.

2. Miscellaneous small Species of Tropical Africa

While studying the collections at Kew in 1932, I had opportunity to make notes on several obscure species, as follows:

27. E. Kirkii C. B. Clarke in Thistleton-Dyer, Fl. Trop. Africa viii. 410 (1902), described from a specimen collected by *Kirk*, "in an island in the River Zambezi, at Victoria Falls," appears to me to be only an immature example, with only partially developed achenes, of the widespread *E. caribaea* (Rottb.) Blake.

28. E. lepta C. B. Clarke in Thistleton-Dyer, Fl. Capensis vii. 758 (1900), based on a collection by Capt. Wolley-Dod from Cape Peninsula, is represented at Kew by a plant without spikelets, having very slender culms (1.5 dm. high), resembling those of *E. capitata* var. *typica*. Of its relationship I can make out nothing.

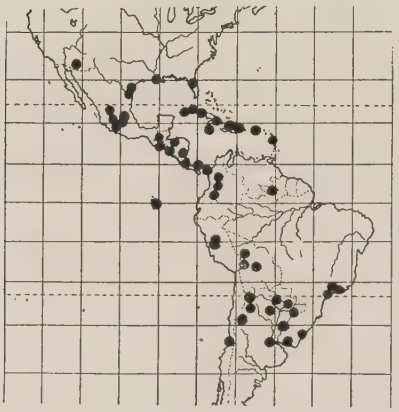
29. E. Schlechteri C. B. Clarke in Thistleton-Dyer, Fl. Capensis vii. 758 (1900); De Wildeman, Plantae Novae Herb. Hort. Thenensis i. t. 6, figs. 10–17 (1904). Coast Region: Onrust River, *Schlechter* no. 9484. The plant which I examined looks like an aberrant collection of *E. caribaea.* The turgidly biconvex achene, yellowish-olive when immature, becoming deep brown to black when ripe, has reddish setae with very short teeth and a small whitened-carunculate style-base. However, the description by Clarke "a very slender short rhizome sometimes present" and De Wildeman's notations accompanying the plate "Tiges . . . réunies en touffes rigides de long d'un rhizome" would tend to remove it from *E. caribaea;* also De Wildeman's comment on the deviation of his specimens from those described by Clarke serves further to make the situation confusing (p. 28), "La plante que nous avons figurée diffère peut-être un peu du type qui a servi à M. C. B. Clarke pour établir son espèce; en effet, on trouve assez souvent dans les épillets de la plante figurée des akènes trigones présentant sur leur face dorsale une carène assez obtuse, mais néanmoins bien visible."

3. Miscellaneous Species of North America and the West Indies

(For classification see Rhodora xxxi. 128,129 (1929)

30. E. nodulosa (Roth) Schultes (Pl. 463, fig. 2). Map 17. Erect from a coarse creeping rootstock: culms green, 1–2 mm. thick, 3–8 dm. high, terete, with numerous, usually conspicuous (sometimes nearly obsolete) *transverse septae:* sheaths elongate, stramineous (often with a purplish-red base), the truncate darkened apex with a distinct mucro: spikelet many-flowered, oblong-lanceolate, acuminate, rarely obtuse, 8–15 mm. long: scales appressed to slightly spreading, 2 mm. long, obtuse to acute, scarious throughout, light to dark brown, with a broad hyaline margin: the lowest suborbicular, firmer, and broadly scarious-margined: anthers 0.8–1 mm. long: *style 2- (not infrequently 3)-fid:* achenes 1 mm. long, broadly obovate, *biconvex,* yellow to brown or olivaceous, *distinctly pitted-reticulate: style-base flattened,* brown (½ as wide as the achene), deltoid, acute, the surface elevated at junction of achene-body: bristles ferrugineous, equalling or slightly exceeding the achene, the common base prolonged into a short stipe. —Mant. ii. 87 (1824); Kunth, Enum. ii. 156 (1837); Boeckl. Linnaea xxxvi. 468 (1869–70); Britton, Journ. N. Y. Microsc. Soc. v. 104 (1889); C. B. Clarke in Urb. Symb. Ant. ii. 67 (1900), in Engler Bot. Jahrb. xxx. Beibl. 68. 21 (1902) and Bull. Herb. Boiss. ser. 2, iii. 1013 [Pl. Hasslerianae 235] (1903); Britton & Wilson, Bot. Porto Rico &

Virgin Isls. v[1]. 91 (1923); Barros, Anales Mus. Hist. Nat. Buenos Aires xxxiv. 445, fig. 9 (1928); Standley, Publ. Field Mus. Bot. viii[4]. 261 (1931); Ostén, Anales Mus. Hist. Nat. Montevideo, ser. 2, iii. 171 (1932). *Scirpus nodulosus* Roth, Nov. Pl. Sp. 29 (1821). *Eleogenus nodulosus* Nees in Mart. Fl. Bras. ii[1]. 104 (1842) and Bonplandia iii. 86 (1855). *Eleocharis consanguinea* Kunth, Enum. ii. 148 (1837).—Arizona to Florida; West Indies, southward to Peru and Argentina. Florida: Eustis, Lake Co., *Nash* no. 219 (G, NY), 1209 (G, NY). Louisiana: Abbeville, *Langlois* 878 (NY); New Iberia, *Tracy* in 1890 (NY); wet prairies, Lake Charles, *Cocks* no. 3129 (G). Texas: Alligator Lake, Jackson County, *Drushel* no. 9560 (B, hb. Drushel). Arizona: Santa Catalina Mts., *Pringle* in 1881 (G, NY) and 1888 (NY); Santa Catalina Mts., 2900 ft., *Thornber* 309 (Pom, US), a form with pale spikelets and scarcely septate culms. Cuba: without loc., *C. Wright* no. 3374 (G, NY); Pinar del Rio, *Britton, Britton & Wilson* no. 9654 (NY), *León & Roca* no. 6932 (NY) and *Shafer* nos. 10477 (NY), 10513 (NY), 11947 (NY); Camaguey, *Britton, Britton & Cowell* no. 13210 (NY) and *Shafer* no. 110 (G, NY); Santa Clara, *Ekman* no. 18865 (NY); Oriente, *Hioram* no. 3923 (NY). Jamaica: Lower Clarendon, *Harris* no. 12729 (G, NY); Belle Vue, *Harris* no. 12179 (G, NY). Haiti: Kalacroix, *Leonard* no. 7852 (G, NY). San Domingo: Higuey, prov. Seibo, *Taylor* no. 426 (NY). Porto Rico: *Britton, Britton & Boynton* no. 8252 (NY); *Sintenis* 3833 (G). Guadeloupe: *Duss* no. 4108 (NY). Mexico: Jalisco, San Sebastian, 1500 m. *Mexia* no. 1851 (G, NY, US); Guadalajara, *Pringle* no. 11725 (G, NY, US); Hidalgo, Mirador, *Liebmann* (G); Michoacan, Morelia, *Arsène* nos. 5649 (NY, US), 5246 (US); Morelos, Cuernavaca, 6500 ft., *Pringle* no. 6599 (G, NY, US). Guatemala: Depart. Santa Rosa, *Heyde & Lux* nos. 3549 (G, US), 3889 (G, NY, US), 6264 (G, US); Coban, 4300 ft., *Tuerckheim* no. 1266 (G, NY, US); Cubilquitz, Alta Verapaz, *Tuerckheim* 8335 (US). Costa Rica: Cartago, *Standley* no. 35462 (US); S. José, *Jimenez* no. 929 (US); Forêts du Tablazo, *Tonduz* no. 7919 (US); Alajuelita, *Tonduz* no. 8845 (G, US). Salvador: Santa Ana, Dept. Santa Ana, *Standley* no. 19680 (G, NY, US). Honduras: Dept. Comayagua, *Standley* nos. 55998 (US) and 56406 (US). Nicaragua: San Rafael del Norte, *Miller & Griscom* nos. 118 (US)



Map 17. Range of Eleocharis nodulosa.

and 130 (US). PANAMA: El Boquete, Chiriqui, 1200 m., *Killip* no. 4568 (NY, US); *A. S. Hitchcock* no. 8257 (US); between Tapia and Tecumen Rivers, *Killip* no. 4174 (NY, US); La Sabana de Panama, *Gervais* no. 164 (US); Las Sabanas, *Standley* no. 25937 (US); near Tapia River, *Maxon & Harvey* no. 6648 (US); between Matias Hernandez and Juan Diaz, *Standley* 32046 (US); Matias Hernandez, *Standley* no. 28858 (US); Rio Tecumen, *Standley* nos. 26631 (US) and 26718 (US); Juan Diaz, *Killip* no. 4091 (US); Chepo, *Pittier* no. 4744 (US). COLOMBIA: California, Dept. Santander, 2000 m., *Killip & Smith* no. 17035 (G, NY); Tolima, *Lehmann* no. 8735 (G, NY); Balsillas, *Rusby & Pennell* in 1917 (NY); prope Moscosio, 2028 m., *André* no. 928 (G, NY); Rio Palo Valley, Cauca, *Pittier* no. 1027 (NY, US); San Antonio, *Langlassé* no. 35 (G, US). ECUADOR: Indefatigable Is., Galapagos Isls., *Svenson* no. 241 (B, G). BOLIVIA: without loc., *Bang* nos. 2306 (G, NY, US) and 2587 (NY, US); Bermejo, 1800 m., *Fiebrig* no. 2328 (G, US); Sorata, *Mandon* no. 1402 (NY); Yapacari, *O. Kuntze* in 1892 (NY); Buena Vista, Dept. Sara, *Steinbach* no. 5278 (NY); Apolo, *R. S. Williams* no. 911 (G, NY); Sud-Yungas, Surupaya, *Buchtien* no. 403 (US); La Paz, 1700 m., *Buchtien* no. 8065 (B, US). CHILE: Santiago, *Claude-Joseph* no. 728 (US); Baireo, *Claude-Joseph* no. 3982 (US). BRAZIL: Limao, Mt. Roraima, *Tate* no. 60 (NY); Minas Geraes, *Claussen* no. 1011 (NY); Caldas, *Regnell* II no. 303½ (US); Itatiaya, 1200 m., *Kuntze* no. 33 (NY); S. Paulo, *Usteri* in 1905 (NY); without loc. *Burchell* no. 4340 (G); without loc. *Glaziou* no. 16539 (US); Viçosa, Minas Geraes, *Mexia* nos. 4851 (B, Ber) and 5171 (B, Ber); Corinto, Minas Geraes, 590 m., *Mexia* no. 5657 (B, Ber). PARAGUAY: Villarica, *Jörgensen* no. 3583 (NY, US); Paracual, *Hassler* no. 687 (NY); superioris fluminis Apa, *Hassler* no. 8382 (G); Pilcomayo River, *Morong* no. 1084 (NY, US); Luque, *Morong* no. 298b (NY, US); San Bernardino, *Rojas* no. 7371 (B, Ost). URUGUAY: Artigas, *Herter* no. 427a (G, NY, US); Toledo, Dept. Canelones, *Herter* no. 427 (G, NY, US). ARGENTINA: Posadas, Misiones, *Ekman* nos. 1254 (NY) and 1311 (NY); Oran, *Lorentz & Hieronymus* no. 432 (NY); Retiro, Buenos Aires, *Parodi* no. 8096 (G); Dept. Andalgala, Prov. Catamarca, *Jörgensen* no. 1766 (G); Dept. Leales, Prov. Tucuman, alt. 300 m., *Venturi* no. 460 (B, US); Dept. Burruyaco, Tucuman, 1500 m., *Venturi* no. 8837 (B, US); Dept. Chicligasta, Tucuman, 1200 m., *Venturi* no. 4011 (B, US); Oran, Prov. Salta, 650 m., *Venturi* no. 5586 (B, US).

Var. TENUIS Boeckl. Flora lxii. 160 (1879); Barros, Anales Mus. Hist. Nat. Buenos Aires xxxiv. 447 (1928).

This variety, differing from typical *E. nodulosa* only in having reduced culms not exceeding 1 mm. in diameter (according to Barros), occurs sporadically throughout the range of the species (cf. *Ekman* no. 18865 (Cuba); *Harris* no. 12729 (Jamaica); *Duss* no. 4108 (Guadeloupe); *Ekman* no. 1311 (Argentina)). On the other hand, it is prob-

able that the slender form more closely approaches Roth's type (Brazil, coll. *Mertens*), described as having filiform culms. Some of the slender plants show practically no external sign of septation, and represent

Var. SUBNODULOSA (Steud.) Kükenthal in Fedde, Rep. Spec. Nov. xxiii. 192 (1926). *E. subnodulosa* Steud. Syn. Cyp. 81 (1855). *E. Ravenelii* Britton in Small, Fl. Southeastern U. S. ed. 2, 184 (1913).

From the United States this variation is so far represented only by *Ravenel* no. 83 (NY) from Neuces Bay near Corpus Christi, Texas (TYPE of *E. Ravenelii*) and by a collection from the Valley of the lower Rio Grande, *Buckley* in 1879–1883 (NY), but is evidently (like the var. *tenuis*) of sporadic occurrence throughout the range of the species. In Steudel's description, based upon a *Duchassaing* collection from Guatemala, the culms are said to be "subcomplanatis tenuissimis indistincte (tactu potius quam visu) subapproximato nodulosis (ultra pedalibus)." Kükenthal cites (l. c.) *Ekman* no. 2683 from Haiti as representing this variety.

According to Barros (l. c.) var. *tenuis* is a transition between typical *E. nodulosa* and *E. contracta* Maury,[1] the latter characterized by filiform, non-septate culms and trigonous achenes. The only named specimen of *E. contracta* which I have examined (Misiones, Argentina, *Ekman* no. 1252 (NY) (det. Kükenthal)) has spikelets with closely appressed scales, filiform culms, and lenticular short-bristled achenes (1.0 mm. long) but under *E. contracta* undoubtedly belongs a similar plant with trigonous achenes (Dept. Leales, Prov. Tucuman, *Venturi* no. 473 (B, US)). Differing markedly from these intergrading variations is a peculiar group of plants from Colombia which may be called

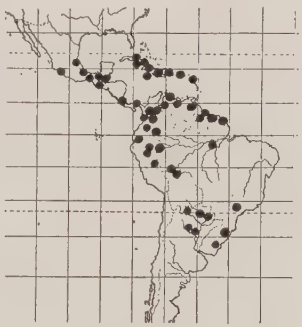
Var. **angulata** n. var. Culmis *non septatis*, 1.5–2 mm. latis (siccatis) squamis paullo divaricatis; *achaeniis trigonis*, 1.2 mm. longis, viridibus vel olivaceis, stylo-basi truncato in medio apiculato, setis achaenio aequantibus.—COLOMBIA: Guasca, *Bro. Ariste-Joseph* no. A340 (TYPE in Gray Herb.; NY, US); PERU: from 9000–10,500 ft., Huanuco, *Macbride & Featherstone* nos. 1453 (US), 2140 (US) and 3318 (US) with yellowish achenes and a pyramidal style-base.

E. nodulosa and *E. geniculata* are ordinarily among the most easily recognized species of the American tropics, due to the septate culms, but in both species plants with non-septate culms are encountered. Due to the resemblance of non-septate plants to specimens of *E.*

[1] Mém. Soc. Phys. Genève xxxi. 139, pl. 41 C. (1890); C. B. Clarke, Bull. Herb. Boiss. ser. 2, iii. 1016 (1903) (where *E. nodulosa* var. *tenuis* is considered a synonym of *E. contracta*); Barros (op. cit.) 457, fig. 14 (1928).

montana, E. Parishii, etc., I was of the opinion (which I do not now hold so strongly) that *E. nodulosa* and *E. geniculata* belonged with the *Truncatae,* and I leave them under that classification for want of a better group with which to ally them. The septate character of the culms of *Scirpus heteromorphus* F. Phil.,[1] based on *Lechler* no. 454 from Valdivia, Chile, led to its inclusion by C. B. Clarke under *E. nodulosa,* but the septations are of the characteristically interrupted type prevalent among the *Palustres* and the material belongs (at least the specimen which I examined at Kew) under *E. valdiviana* Philippi.

31. Eleocharis geniculata (L.) R. & S. (Pl. 463, fig. 1). Map 18. *Coarse aquatic plants,* erect from a ligneous creeping rootstock; culms *terete,* firm, green, 1–15 dm. high, *3–10 mm. wide,* with close, *usually prominent septae:* sheaths reddish, truncate at the summit, usually with an inconspicuous subulate mucro: spikelets many-flowered, lanceolate to cylindric, usually acute: scales 2 mm. long, not keeled, obtuse, thin, with an opaque brown central area and broad scarious light brown margin: *style 2- or 3-fid:* achene 1.5 mm. long, obovate, *biconvex to slightly trigonous,* yellow to brown, shining, *lightly punctate-reticulate:* style-base dark brown, flattened, lanceolate, half as long as the achene-body: bristles deep brown, nearly equalling the tubercle, their common base forming a short stipe.—Syst. ii. 150 (1817); Kunth, Enum. ii. 152 (1837); Boeckl. Linnaea xxxvi. 469 (1869–70); C. B. Clarke, Bull. Herb. Boiss. ser. 2, iii. 1016 [Pl. Hasslerianae 238] (1903); C. B. Clarke, Contrib. U. S. Nat. Herb. x. 457 (1908) and Ill. Cyp. t. xxxix. f. 22–26 (1909); Britton & Wilson, Surv. Porto Rico & Virgin Isl. v[1]. 92 (1923); Standley, Field Mus. Publ. Bot. viii[4]. 262 (1931); Uittien in Pulle, Fl. Surinam i. 113 (1934); Macbride, Publ. Field Mus. Bot. xiii. 281 (1936). *Scirpus geniculatus* L. Sp. Pl. 48 (1753). *Scirpus elegans* HBK. Nov. Gen. et Sp. i. 226 (1816). *E. elegans* R. & S. Syst. ii. 150 (1817). *Elcocharis constricta* Schultes, Mant. ii. 87 (1824); Kunth, Enum. ii. 153 (1837); Steudel, Syn. Cyp. 82 (1855). *Scirpus depressus* Vellozo, Fl. Fluminensis 35, t. xxxviii (1827), acc. to Index Kewensis. *Limnochloa crassiculmis* and *L. constricta* Nees in Mart. Fl. Bras. ii[2]. 99 (1842). ?*Eleocharis crassicaulis* [error for *crassiculmis*] Steudel, Syn. Cyp. 81 (1855). *E.*



Map 18. Range of Eleocharis geniculata.

[1] Cat. Pl. Chil. 311 (1881). *Isolepis heteromorpha* Steud. Syn. Cyp. 100 (1855).

mexicana Peyr. in Linnaea xxx. 14 (1859–60) acc. to Index Kewensis. *Chlorocharis geniculata* Rikli, Pringsheim Jahrb. xxvii. 564 (1895)—Mexico: Rio Xalcomulco, *Liebmann* (G); Michoacan & Guerrero, Sierra Madre, *Langlassé* no. 842 (G); Colima, *E. Palmer* no. 1260 in 1891 (G, NY); Tehuantepec, Vera Cruz, *C. L. Smith* no. 1060 (G, NY); Tanteyuca, *Ehrenberg* no. 208 (G); without further locality, *F. Mueller* no. 1762 (NY). Cuba: La Perla, Oriente, *Shafer* no. 8572 (NY); Cuba orientali, *C. Wright* no. 709 (as *Scirpus constrictus* Griseb.) (NY); Loma del Gato, Cobre Range of Sierra Maestra, *León, Clement & Roca* no. 10220 (NY); Matanzas, *Britton, Britton & Shafer* no. 293 (NY); San Luis, Prov. Santiago, *Pollard & Palmer* no. 296 (NY); Taza, Prov. Santa Clara, *León* no. 1450 (NY); Santo Domingo, Prov. Santa Clara, *Britton, Earle & Cowell* no. 10311 (NY). Jamaica: Hardware Gap, *G. E. Nichols* no. 87 (NY), and *Harris* no. 10900 (4075 ft.) (NY); Port Antonio, *A. E. Wight* no. 51 (NY); Balaclava, *Marble* no. 913 (NY); Inverness, Lower Clarendon, *Harris* no. 12718 (NY); near Castleton Bot. Garden, *L. M. Underwood* no. 131 (NY); Ewarton, *Underwood* no. 1867 (NY), and *Harris* no. 6723 (NY); Cinchona, *Underwood* no. 159 (NY); Liguanea Ridge, Hope Estate, *Harris* no. 11701 (C, NY); Belle Vue, near Spanish Town, *Harris* no. 12181 (NY). Haiti: Bayeux, Port Margot, *Nash* no. 326 (NY); La Barrière Couchant, *Nash & Taylor* no. 1074 (NY); Port au Prince, *Leonard* no. 2806 (NY); Furcy, alt. 1300 m., *Leonard* no. 4348 (NY); Gonave Island, *Leonard* no. 3266 (NY); St. Michel de l'Atalaye, Dept. du Nord, *Leonard* no. 7038 (NY). San Domingo: Bonao, Prov. La Vega, *Valeur* no. 430 (NY); Sanchez, Prov. Samana, *N. Taylor* nos. 24 (NY) and 88 (NY); without location, *C. Wright, Parry & Brummel* no. 596 (NY). Porto Rico: Rio Piedras, *Heller* no. 170 (NY); Mayaguez, *Britton* no. 2361 (NY); Sierra de Naguabo, *Shafer* nos. 3164 (NY), and 3438 (NY); Indiera Fria, near Maricao, *Britton, Cowell & Brown* no. 4534 (NY); Utuado, *Britton & Cowell* no. 416 (NY); Caguas, *Underwood & Griggs* no. 304 (NY); Cayey, *Underwood & Griggs* no. 280 (NY); Rio Piedra, *J. R. Johnston* no. 110 (NY); Luquillo Mts., *Britton & Bruner* no. 7555 (NY); Anasco, *Heller* no. 4534 (NY); Guanajibo, *Fredholm* no. 4252 (B). Guadeloupe: Duss no. 3123 (NY). Guatemala: *Tonduz* no. 845 (NY); Quebrados, Dept. Izabal, *Pittier* no. 8620 (G); Quirigua, Dept. Izabal, *Standley* no. 24162 (NY); Gualan, *C. C. Deam* no. 436 (G); El Rancho, Dept. Jalapa, *Kellerman* no. 8008 (NY); Coban, Dept. Alta Vera Paz, *Seler* no. 2403 (NY), and *Tuerckheim* no. 544 (G). Honduras: San Pedro Sula, Dept. Santa Barbara, *C. Thieme* no. 5571 (G); vic. Tela, Prov. Atlantida, *E. R. Mitchell* no. 102 (G). El Salvador: vic. San Salvador, *Standley* no. 22421 (G); Ixtepeque, Dept. San Vincente, *Standley* no. 21445 (G); Zacatecoluca, *Calderón* no. 300 (G). Costa Rica: Peralta, *Rowlee* no. 50 (NY); San Francisco de Guadalupe, *Tonduz* no. 8492 (G). Panama: Isthmus of Panama, *J. M. Bigelow* (NY); Panama-Corozal Road, *Killip* no. 4117 (NY). Venezuela: Yaritagua y Duaca, Lara,

Saer no. 322 (NY); Caracas, *Pittier* nos. 9439 (NY) and 9529 (NY), *O. Kuntze* in 1874 (NY), and *A. H. Moore* no. 20 (Cal.); Valera, *Pittier* no. 10792 (NY); Agua Fria, near Caracas, *Pittier* no. 11504 (NY); Guárico, *Pittier* no. 12471 (NY) and *Plantae Grisolanae* no. 19 (NY); Tovar, *Pittier* no. 12769 (NY); lower Orinoco, *Rusby* & *Squires* no. 337 (NY). COLOMBIA: Intendencia Meta, Villavicencio, *Pennell* no. 1507 (NY); Dept. Antioquia, Medellin, *Archer* no. 75 (B, US); Dept. Cundinamarca, Fusagasuga, *Pennell* no. 2696 (NY); Dept. Tolima, Honda, *Pennell* no. 3682 (NY); Dept. Santander, Boca Sogamoso, *Pennell* no. 3846 (NY); alt. 3500 ft., Mt. Chapon, Dept. Boyaca, *Lawrance* no. 119 (NY); Dept. Norte de Santander, Cucuta, *Killip* & *Smith* no. 20976 (NY); Dept. El Valle, La Cumbre, *Pennell* & *Killip* no. 5741 (NY); Dept. El Valle, east of Zarzal, *Pennell, Killip* & *Hazen* no. 8582 (NY); Dept. Caldas, Armenia, *Pennell, Killip* & *Hazen* no. 6641 (NY); Bonda, Santa Marta, *H. H. Smith* no. 2338 (NY); La Paila, Neogranadina-Caucana, *Holton* no. 113 (NY); Falls of the Truando, Prov. Choco, *Schott* (NY); *Mutis*, nos. 4238 (US), 2874 (US). ECUADOR: Prov. Guayas, between Guayaquil and Salinas, *A. S. Hitchcock* no. 20090 (NY); Naranjal, *Luis Mille* no. 136 (NY). PERU: Dept. Loreto, Iquitos, *Klug* no. 1286 (NY). BOLIVIA: Lake Rogagua, *Rusby* no. 1602 (NY); Beni River, *Rusby* no. 178 (NY); Velasco, *O. Kuntze* in 1892 (NY); Rio Sapucahy, Paraisopolis, Minas, *Hoehne* no. 19147 (G). BRITISH GUIANA: Bartica, Upper Mazaruni River, *Leng* in 1922 (NY); coast lands, *Jenman* no. 6110 (NY); Junction Mazaruni and Cuyuni Rivers, *Graham* no. 265 (NY). FRENCH GUIANA: Cayenne, *Broadway* no. 910 (NY). BRAZIL: Prov. Goyaz, *Glaziou* no. 22332 (NY); Paraná, Curityba, *Dusén* no. 6917 (NY); Jararaca, Pará, *Da Costa* no. 158 (NY); without locality, *Burchell* no. 9373 (NY). PARAGUAY: Pilcomayo River, *Morong* nos. 862 (NY) and 1036 (NY); San Bernardino, Rio Salado, *Rojas* no. 8640 (G); without loc., *Hassler* no. 1694 (NY). ARGENTINA: Terr. Chaco, Dept. Resistencia, 150 m. alt., *Venturi* no. 7896 (US).

A plant with the appearance of an *Equisetum* and, as described by Morong (Ann. N. Y. Acad. Sci. vii. 254 (1893), "an elegant species, 1–1½ m. high, with many stout stems from the same root, the sheaths at the base red, and the pure white feathery-looking heads 2–4 cm. long," it is apparently the only tropical *Eleocharis* which catches the eye of the general collector. As a consequence and due also to its wide range, the representation in herbaria is voluminous. It was known from the West Indies in very early times, having been described by Linnaeus (1753) as "Scirpus culmo tereti nudo, spica subglobosa terminali."[1] *Limnochloa constricta* was based on Brazilian

[1] Mr. J. E. Dandy of the British Museum has recently written me that apparently the only specimen of *Scirpus geniculatus* which Linnaeus saw was *Scirpus culmo nudo, spica terminatrice subrotunda* of Hortus Cliffortianus, from which Linnaeus drew the

material in which the culms were constricted below the spikelets and *L. crassiculmis*, also from Brazil, represented a coarse form with the septae scarcely evident. *E. singularis* was described by Steudel from *Hostman* no. 284a from Surinam, wholly because of the indefinite character of the Linnaean description.

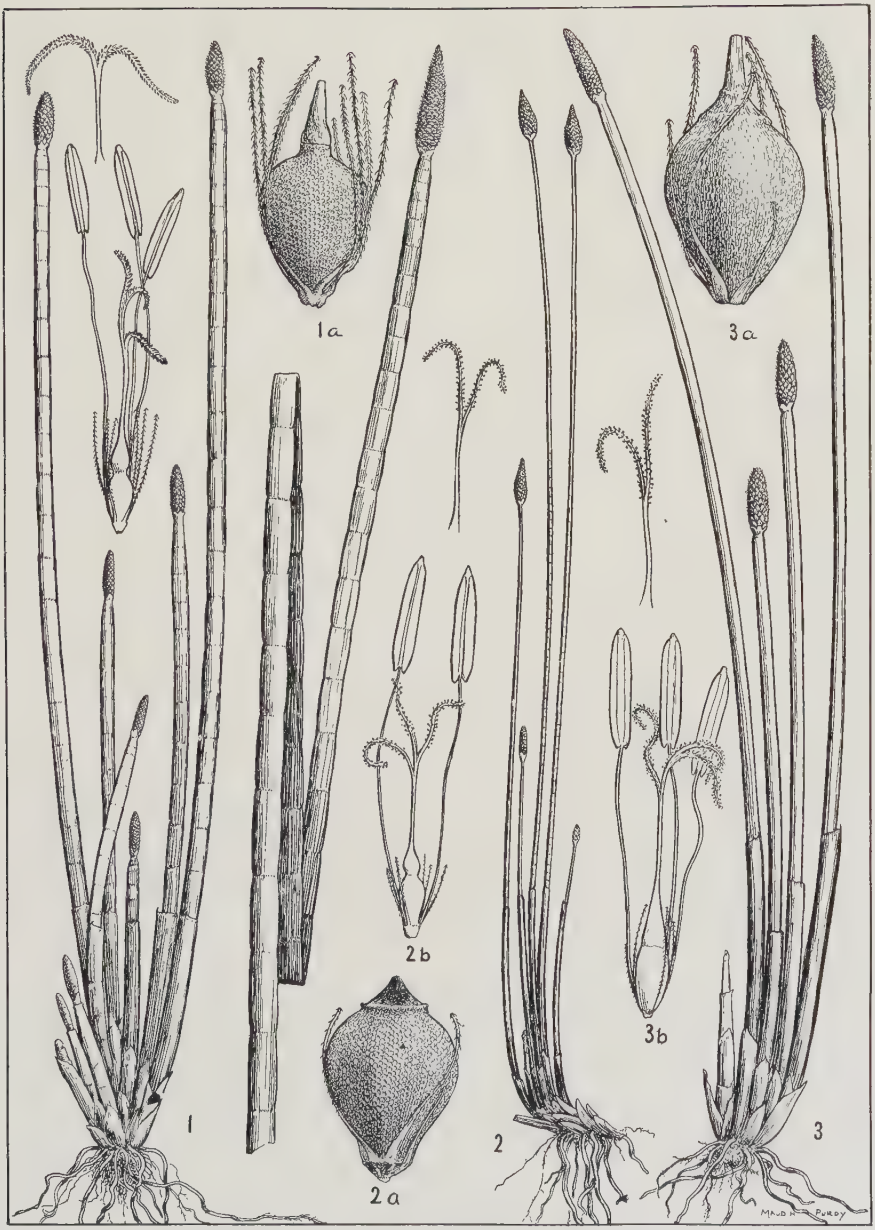
Var. DENSA (Bentham) Boeckl. (Pl. 463, FIG. 3). Culms without externally apparent septae.—Linnaea xxxvi. 470 (1869–70).—*Eleocharis densa* Bentham, Pl. Hartweg. 27 (1839); Steudel, Syn. Cyp. 82 (1855); Hemsley, Biol. Cent.-Am. Bot. iii. 455 (1885).—MEXICO: Aguas Calientes, *Hartweg* no. 242 (G, NY); marshes of the Rio Grande de Santiago near Atequiza, Jalisco, *Pringle* no. 3124 (G, NY); Durango, *E. Palmer* no. 543 in 1896 (G, NY, US); Laguna San Baltazar, Puebla, *Arsène* no. 218 (G); vic. Morelia, Michoacan, *Arsène* no. 9806 (G).

With lack of apparent septae (although the partitions are prominent internally) and achenes appearing to be less deeply reticulate than in *E. geniculata*, this plant of localized distribution in Mexico, may perhaps represent a distinct species.

E. Parodii Barros Anales Mus. Hist. Nat. Buenos Aires xxxiv. 480, fig. 28 (1928), a well-marked species of Argentina and Uruguay, is close to *E. geniculata* and, perhaps, as Barros points out, represents *E. crassiculmis*. It also has culms practically non-septate.

32. E. RECLINATA Kunth (Pl. 465, FIG. 3). MAP 19. *Annual* (?), diffusely spreading from fibrous roots or from a thin descending rhizome: culms numerous, *of unequal length*, 0.2–4 dm. long, *usually reclining*, grayish-green, irregularly sulcate: sheath-apex soft and spreading, a short, hardened apiculate projection frequently present: spikelets cylindric-ovoid, *acute*, 2–7 mm. long, loosely 5–20-flowered: scales obtuse, with broad green keel and brownish sides, the lowest scale rounded and completely encircling the culm: stamens 2, anthers 0.4 mm. long: style 3-fid: achene obovoid to pyriform, 1.5 mm. long (including the style-base), obtusely trigonous, *light glistening olive, with minute punctulate reticulation:* the brownish style-base conic-subulate: bristles pale brown, equalling or slightly exceeding the style-base.—Enum. ii. 143 (1837); Steudel, Syn. Cyp. 75 (1855); House, N. Y. State Mus. Bull. 243–244. 43 (1921). *Scirpus intermedius* Muhl. Gram. 31 (1817), not Thuill. (1799) nor Poir. (1804). *Eleocharis intermedia* Schultes, Mant. ii. 91 (1824); Torrey, Ann. Lyc. N. Y. iii. 302 (1836); Steudel, Syn. Cyp. 75 (1855); Boeckl. Linnaea

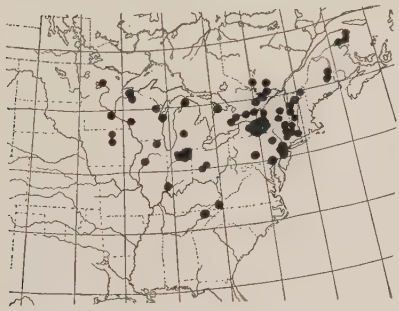
description. This specimen (now at the British Museum) is *Scirpus caribaeus* Rottb., a name which must therefore be superseded by *S. geniculatus*. However, since Linnaeus' specific name "*geniculatus*" was derived from the Sloan reference (Sp. Pl. i. 48), based on figures representing both *E. geniculata* and *E. caribaea*, there is something to be said on both sides.



ELEOCHARIS, ~~SERIES TENUISSIMAE~~ (habit × ½, achenes × 20). FIG. 1, E. GENICULATA. FIG. 2, E. NODULOSA. FIG. 3, E. GENICULATA, var. DENSA.

Eleocharis, ~~series~~ ~~Tenuissimae~~ (habit × ½, spikelets × 2½, achenes × 20, except figs. 1–3 (× 10)). Figs. 1–3, E. tuberculosa. Fig. 4, E. tortilis. Fig. 5, E. cylindrica. Fig. 6, E. melanocarpa. Fig. 7, E. albida.

xxxvi. 436 (1869–70); Britton, Journ. N. Y. Microsc. Soc. v. 110 (1889); Britton & Brown, Ill. Fl. i. 255, fig. 597 (1896); Robinson & Fernald in Gray, Man. ed. 7, 184, fig. 261 (1908).—Shores of ponds and rivers, chiefly in calcareous areas, from eastern Quebec south to Tennessee, west to Minnesota. The following specimens are cited to show the range of the species; many of the numerous collections from central New York and elsewhere have been omitted. QUEBEC: Wakefield, *Marie-Victorin* no. 10280 (G); N. Wakefield, *Macoun* no. 7553 (Can); Little Cascapedia River, *Fernald, Collins* & *Pease* in 1904 (G); Dartmouth River, Gaspé County, *Collins, Fernald* & *Pease* in 1904 (G, NY). MAINE: Nadeau Lake, Fort Fairfield, *Robinson* & *Fernald*, Pl. Exsic. Gray. no. 9 (Alb, Cal, G, NY); Patten, *Fernald* in 1897 (G). NEW HAMPSHIRE: Colebrook, *Fernald* & *Pease* no. 16948 (G). VERMONT: Willoughby, *Kennedy* in 1896 (G); Lake Dunmore, *Brainerd* in 1896 (G, NY); Woodbury, *Brainerd* in 1899 (G); Brandon, *Dutton* in 1914 (G); Winooski River, Montpelier, *Brainerd* in 1899 (G); sandy border of Conn. River, Westminster, *Brainerd* in 1899 (G); Ewell's Pond, Peacham, *Blanchard* in 1884 (Alb). MASSACHUSETTS: Lanesboro, muddy inlet to Pontoosuc Lake, *Churchill* in 1918 (G). CONNECTICUT: sandbars of Conn. River, Hartford, *C. Wright* in 1882 (G); bank of lake, Salisbury, *Bissell* in 1901 (NY); Twin Lakes, Salisbury, *Bissell* in 1901 (G, NY). NEW YORK: Dryden, *Eames* & *Wiegand* no. 9343 (G); Spencer, *Eames* & *Wiegand* no. 11434 (Alb, G); Saratoga Lake, *House* no. 21892 (NY); Pine Plains, Dutchess County, *Hoysradt* in 1878 (NY); Clove, Dutchess County, *Standley* & *Bollman* no. 12323 (US); Cedar Lake, Litchfield, *Haberer* no. 1552 (Alb, G); Oneida Lake, *House* in 1903 (NY) and *Haberer* no. 1554 (Alb, G); Cedarville, Herkimer County, *Paine* (G); Fabius, Onondaga County, *Hotchkiss* no. 3536 (Alb); Sodus Bay, *House* no. 19667 (Alb); Mendon Ponds, Monroe County, *House* no. 19653 (Alb); Woodville, Jefferson County, *House* nos. 9914 and 19699 (Alb); Fenner, Madison County, *House* no. 17056 (Alb); Knickerbocker Lake, Columbia County, *C. A. Brown* no. 516 (Alb); Glenmont, Albany County, *House* (Alb); Green Island, Albany, *E. C. Howe* in 1886 (NY); Penn Yan, *Wright* (B); Penn Yan, *Sartwell* (G); Cayuga Lake, *Dudley* in 1884 (NY); Oriskany, Vasey (NY). NEW JERSEY: Sussex County, Lake Grinnell, *Britton* in 1887 (NY); South Plainfield, *Miller* no. 4 (NY); Sparta, *Mackenzie* no. 6800 (NY),



MAP 19. Range of ELEOCHARIS RECLINATA.

and *Porter* in 1887 (B); Warbasse, *Mackenzie* no. 6783 (NY); Black River, Morris County, *Mackenzie* no. 4370 (NY); Marksboro, Warren County, *Mackenzie* no. 6814 (NY). Pennsylvania: Bethlehem, *Rau* in 1871 (NY, Ph); Dillerville Swamp, Lancaster, *Small* in 1889 and 1892 (NY); Pa. Furnace, Huntingdon County, *Boecking* in 1870 (NY). Ontario: North Wakefield, *Macoun* no. 7553 (NY, Can); Opsongo Lake, Algonquin Park, *Macoun*, no. 81021 (Can); Point Edward, near Sarnia, *Macoun* no. 81020 (Can); Cartwright, *Scott* no. 16364 (Can); Bay of Quinte, *Macoun* 32181 (Can); Toronto, *Scott* no. 25215 (Can); Snelgrove, *White* no. 59068 (Can); Belleville, *Macoun* no. 32682 (Can); Casselman, *Macoun* no. 86434 (Can); Stittsville, *Macoun* no. 86433 (Can); Moose Creek, near Ottawa, *Macoun* in 1891 (NY); Owen Sound, *Macoun* no. 34567 (G, NY); Galt, *Herriot* nos. 68518, 36 (G). Michigan: Grayling, *Hicks* in 1888 (G); Munith, *Hicks* in 1893 (G). Wisconsin: Cedar Lake, Kiel, *Fassett* & *Hoffmann* no. 16877 (B); White Potato Lake, Oconto County, *Hotchkiss* & *Kochler* no. 4329 (B); west side of Lake Chetoc, Sawyer County, *Hotchkiss* & *Kochler* no. 4367 (B); Lacrosse, *T. J. Hale* in 1861 (G); Pike River Falls, *Hasse* in 1884 (NY). Illinois: Ringwood, *Vasey* (Ill, G); Peoria, *F. Brendel* (Ill, NY). Ohio: Columbus, *Riddell* (NY); Franklin County, *Werner* in 1890 (NY); Springfield, *Lea* (NY). Indiana: Noble County: Acinda, *Deam* no. 47665 (D), and Tippecanoe Lake, *Deam* no. 21761 (D); low marl border of Deep Lake 1 mi. s. of Wolf Lake, Noble County, *Deam* no. 14665 (D, G); near Decker, Knox County, *Deam* no. 32955 (D, G); Lake of the Woods, Marshall County, *Deam* no. 21009 (D); near Knox, Starke County, *Deam* no. 42183 (D); Goose Lake, Whitley County, *Deam* no. 21763 (D); Fish Lake, Fermont, Steuben County, *Deam* no. 55417 (B); near Edgewater, Emmet County, *C. F. Fallass* in 1924 (D). Minnesota: Bohall Lake, Clearwater County, *N. L. Grant* no. 3251 (NY); Fort Ripley, Crow Wing County, *Rosendahl* & *Butters* no. 3602 (as *E. acicularis*) (G); *T. J. Hale* (G).

Stations shown in Iowa on the distributional map represent Charles City and Story City, from data by R. C. Cratty, Bull. Nat. Hist. State Univ. Iowa iv. 327 (1898). No substantiation of the occurrence of this species in Georgia (coll. Baldwin, cf. Torrey, l. c. p. 302) can be made, but I believe that there is a misdetermination.

Eleocharis reclinata, described by Kunth from western Virginia, "ad ripas fluvii Holston" on the basis of material collected by Beyrich[1] is the plant earlier described by Muhlenberg as *Scirpus intermedius*, a name unfortunately previously applied to at least two European species. Muhlenberg described his plant (which I have seen at Philadelphia, also at New York) as having a bifid pistil, an error perpetuated

[1] Charles Beyrich, a member of Allen's expedition to the source of the Mississippi, died at Fort Gibson in 1834.

by Kunth and Boeckeler; on the other hand I have found the number of stamens to be constantly only two. Although the apices of the sheaths tend to be soft, many will be found showing an apical projection, and this fact, together with the punctulate surface of the achene, resembling that of *E. arenicola*, places *E. reclinata* within the *Palustriformes*, subser. *Truncatae*. Plants in which the bristles are absent or rudimentary, and which differ in no other respect from typical material, are known from Oneida Lake, New York, and, in conformity with treatment of similar variations in other species of *Eleocharis*, should be called

Forma **Habereri** (Fernald) n. comb.—*E. intermedia* var. *Habereri* Fernald, Rhodora viii. 130 (1906); *E. reclinata* var. *Habereri* (Fernald) House, N. Y. State Mus. Bull. 243–244. 43 (1923).

33. E. Macounii Fernald. Resembling *E. reclinata*, but coarser: culms up to 2.5 dm. long; *spikelets 3–10 mm. long, many-flowered, the scales appressed, brownish*, with a greenish midrib; stamens 3, anthers 0.4 mm. long; style 3-fid; achene sharply trigonous to biconvex, yellow-olive, minutely reticulate, 1.4 mm. long, including the brownish *deltoid-conical style-base;* bristles light brown, exceeding the style-base.—Proc. Am. Acad. xxxiv. 497, fig. 26a (1899); Robinson & Fernald in Gray, Man. ed. 7, 185, fig. 262 (1908). Quebec: borders of marshes, North Wakefield, Sept. 13, 1893, *Macoun* no. 7552 (Can, G, NY).

This peculiar plant, known only from the original collection, in many respects suggests an aberrant *E. intermedia* and the lack of fertility (very few ripe achenes are produced) would tend to support this conclusion. Thus in Britton & Brown, Ill. Fl. ed. 2, 318 (1913) it is treated as a synonym of *E. intermedia* [*E. reclinata*]. The achenes vary from sharply trigonous to practically biconvex, but have a much fainter reticulation than is present in *E. reclinata*, and the style-base (the most characteristic feature) is short-deltoid, as compared with the long subulate style-base of *E. reclinata*. The plant much resembles a European species, *E. multicaulis*, but lacks the tendency to proliferation nearly always seen in that species, which, furthermore, has anthers as large as those in *E. palustris*. The small anthers of *E. Macounii* are identical with those of *E. reclinata*. For the present I believe it is advisable to treat *E. Macounii* as a distinct species.

34. E. cylindrica Buckley (Pl. 464, fig. 5). Culms erect from a *slender ligneous rhizome, filiform*, 2–3 dm. long, sulcate and angled: sheaths stramineous to light brown, truncate at the apex and conspicuously subulate-toothed: spikelets *linear-cylindric*, many-flowered, acute, 8–17 mm. long, not exceeding 2 mm. in width: scales lanceolate,

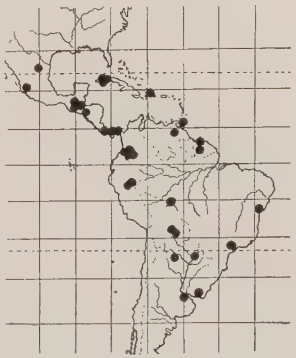
acute, chestnut brown, not strongly keeled, the scarious margins inrolled at maturity; stamens 3, anthers 0.7 mm. long: style 3-fid: achene 0.8 mm. long, dark brown, obovate, smooth to faintly reticulate, *trigonous with sharply costate angles, conspicuously narrowed at the apex:* style-base light brown, pyramidal, a little wider than the constricted apex of the achene: bristles slender, brown, much shorter than the achene.—Proc. Acad. Nat. Sci. Phila. 1862. 10 (1863); Britton, Journ. N. Y. Microsc. Soc. v. 109 (1889). *Heliocharis texana* Britton, Bull. Torr. Bot. Club xi. 87 (1884).—Texas: northern Texas, *Buckley* (type Ph, NY); Valley of the Lower Rio Grande, *Buckley* in 1879–1883 (type of *E. texana* (NY)). New Mexico: *C. Wright* no. 1935 (NY).

This poorly-known species is closely related to *E. Parishii*, which it resembles in habit and in the peculiarly constricted achenes, and also to some Argentine species, notably *E. Spegazzinii* Barros.[1] The winged angles of the achenes, and their small size bring *E. cylindrica* close also to *E. tricostata*.

35. E. filiculmis Kunth (Pl. 465, figs. 1, 2). Map 20. Erect from an ascending caudex: culms 1.5–4 dm. high, flattened and sulcate, lightly punctate, rarely as much as 1 mm. wide: sheath purplish brown to stramineous, acute, sometimes slightly inflated at the apex: spikelets ovoid-cylindric, 4-10 mm. long, many-flowered: scales obtuse to emarginate, stramineous to reddish-brown, with a lighter keel and a prominently scarious margin: anthers 0.7 mm. long: style 3-fid: achene 1.0 mm. long, trigonous with sulcate angles, glistening white, often obscurely reticulate or brown-striolate: style-base nearly as wide as the apex of the achene, irregularly pyramidal, often somewhat flattened, white to light brown, frequently with overhanging margins: bristles white, usually equalling the achene.—Enum. ii. 144 (1837); Steudel, Syn. Cyp. 75 (1855). *Scirpus sulcatus* Roth, Nov. Pl. 30 (1821), not Petit Thouars (1811). *Scirpidium sulcatum* Nees in Mart. Fl. Bras. ii[1]. 98 (1842) and in Bonplandia iii. 86 (1855). *Eleocharis sulcata* Nees, Linnaea ix. 294 (1834) (nomen) and in Kunth, Enum. ii. 157 (1837) (nomen); Boeckl. Linnaea xxxvi. 445 (1869–70); Hemsley, Biol. Cent.-Am. Bot. iii. 457 (1885); Britton, Journ. N. Y. Micr. Soc. v. 107 (1889); C. B. Clarke, Bull. Herb. Boiss. ser. 2, iii. 1015 [Pl. Hasslerianae 237] (1903); Barros, Anales Mus. Hist. Nat. Buenos Aires xxxiv. 459, fig. 16 (1928); Standley, Field Mus. Bot. Ser. viii[4]. 263 (1931); Ostén, Anales Mus. Hist. Nat. Montevideo, ser. 2a, iii. 178 (1932); Uittien in Pulle, Fl. Surinam i. 113 (1934). *Limnochloa calyptrata* Liebm. Vidensk. Selsk. Skr. v. ii. 244 (1851). *Eleocharis calyptrata* Steud. Syn. Cyp. 81 (1855); Hemsley, Biol. Cent.-Am. Bot. iii. 455 (1885). *E. Rothiana* Boeckl. Flora xliii. 3 (1860) and Linnaea xxxvi. 444 (1869–70). *Scirpus filiculmis* Schrad. ex Griseb.

[1] Anales Mus. Nat. Hist. Buenos Aires xxxiv. 474, fig. 25 (1928).

in Goett. Abh. xxiv. 311 (1879), acc. to Index Kewensis. *E. Balansaiana* Boeckl. in Flora v. 62 (1879) acc. to Barros (l. c.). *E. costaricensis* Boeckl. and *E. purpureo-vaginata* Boeckl. Allg. Bot. Zeit. ii. 34 (1896).—West Indies, Mexico, and southward to Paraguay and Argentina [Buenos Aires and other localities cited by Barros (l. c.)]. CUBA: Isle of Pines, *A. A. Taylor* no. 54 (G, NY); Nueva Gerona, Isle of Pines, *Palmer* & *Riley* no. 993 (NY); in wet savannas, near Herradura, Pinar del Rio, *Van Hermann* no. 293 (NY); pine woods, boggy places, Herradura, *F. S. Earle* no. 732 (NY); in pinelands, Herradura, *Ekman* no. 17789 (NY); Pinar del Rio, *Ekman* no. 16661 (G); palm-barrens west of Guane, Pinar del Rio, *Shafer* no. 10501 (NY). DOMINICA: Pimentel, *Abbott* no. 722 (NY). MEXICO: Quimixto, Jalisco, *Mexia* no. 1215 (NY); Saltillo, Coahuila, *Fr. Adole* no. 26 (NY); Saltillo, *Gregg* in 1897 (NY). GUATEMALA: Coban, *Tuerckheim* nos. 429 (G, NY), 1267 (NY), and 1383 (G, NY); inter Coban et Gualan, *Bernoulli* no. 801 (NY); Livingston, *Tuerckheim* no. 1219 (NY); Quebradas, Dept. Izabal, *S. F. Blake* no. 7517 (G) (as *E. elassocarpa*). EL SALVADOR: Ixtepeque, Dept. San Vicente, *Standley* no. 21452 (G, NY). PANAMA: wet fields, in dense tufts, near Matias Hernandez, Prov. Panama, *Standley* no. 28983 (NY); between Fort Clayton and Corozal, *Standley* no. 29168 (NY); Juan Diaz, Prov. Panama, *Killip* no. 4093 (NY); El Boquete, Prov. Chiriqui, *Killip* nos. 4531 (NY) and 4585 (NY); Aguadulce, Prov. Coclé, near sea level, *Pittier* no. 4896 (NY); Penonome, *R. S. Williams*, no. 301 (NY); dry fields, Chivi-Chivi, *Killip* no. 4078 (NY). VENEZUELA: Riverside, Ciudad Bolivar, *L. H. Bailey* nos. 1360 (NY), 1654 (G, NY), and 1691 (NY). TRINIDAD: Mora forest, *Broadway* no. 7351 (NY); Piarco Savanna, *Broadway* no. 2144 (NY); Guanapo, *McLean* in 1913 (NY). COLOMBIA: wet marl, alt. 1500 m., Mesa de los Santos, Dept. Santander, *Killip* & *Smith* nos. 15045 (G, NY) and 21186 (NY); Neiva, Dept. Huila, *Rusby* & *Pennell* no. 1070 (NY); Armenia, Dept. Caldas, *Pennell, Killip* & *Hazen* no. 8644 (G, NY); Buenaventura, Dept. El Valle, *Killip* no. 11682 (G, NY); without loc., *Funck* & *Schlim* in 1862 (NY). PERU: Yurimaguas, Dept. Loreto, *Killip* & *Smith* nos. 27959 (NY) and 29067 (NY); prope Tarapoto, Peruv. orientalis, *Spruce* no. 4283 (NY). BOLIVIA: Buenavista, Dept. Santa Cruz, *Steinbach* no. 6946 (NY); Yapacani, *O. Kuntze* no. 133 (NY). SURINAM: *Schweinitz* (NY). BRAZIL: Matto Grosso, *S. Moore* no. 112 (NY). PARAGUAY: Asuncion, *Morong* no. 249 (G, NY); *Hassler* no. 501 (NY); Cordillera de Villa-Rica, *Hassler* no. 8686 (G).

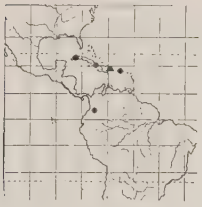


MAP 20. Range of ELEOCHARIS FILICULMIS.

The name *E. filiculmis* clearly antedates *E. sulcata* (Nees) Kunth, but I am not at all certain that it is the oldest available name, for a maze of synonymy surrounds the Brazilian plants, to be cleared up only by recourse to the herbaria of Nees and other early writers. Schrader's specimen of *Scirpus filiculmis* at Berlin, upon which *E. filiculmis* Kunth was based, was seen by Boeckeler and treated by him as a variant of *E. sulcata* "variat porro rhizomate abbreviato culmisque basi tuberascentibus." *E. Rothiana* Boeckl. was a renaming of *Scirpus sulcatus* Roth (1821) (already occupied by Du Petit-Thouars' species from St. Helena) which also received the name *Fimbristylis sulcata* Schultes, Mant. ii. 52 (1824). At least two additional names to be reckoned with are *Chaetocyperus tenuiculus* Nees, in Mart. Fl. Bras. ii[1]. 96 (1842), based on *Scirpus tenuiculus* Schrader in Schultes, Mant. ii. 74 (1824), and *Chactocyperus emarginatus* Nees (l. c.); the former, as differentiated by Nees, having a short truncate style-base as wide as the achene, the latter with a rostriform thickened obtuse style-base. Both species came from eastern Brazil. Through the kindness of Dr. Ostenfeld, I have borrowed the type specimen of *E. calyptrata* Liebmann, which is illustrated (pl. 465, fig. 2), and which is unquestionably the same as other Central American material passing as *E. sulcata.*

E. filiculmis is the connecting link between series *Tenuissimae* and a group of larger species (*E. pachystyla,* etc.) abundantly represented in Argentina (cf. Barros l. c.), but shows also a strong resemblance to the African *E. anceps.*

36. E. PACHYSTYLA (C. Wright) Clarke (Pl. 465, fig. 4). Map 21. Culms numerous from a *short horizontal or branched-ascending rootstock:* culms 3–5 cm. long, 1–2 mm. wide, rather soft, terete to flattened-sulcate when dry: sheaths dark reddish-brown, not loose, oblique at the herbaceous, but firm, apex: spikelets *obovoid, obtuse,* 5–7 mm. long, *often clavate at the base:* scales obtuse, thin, scarcely keeled, stramineous with brown-flecked margins, the lowest inclined to be cartilaginous: stamens 3, anthers 0.7 mm. long: style 3-fid: achene narrowly obovoid, trigonous, 1.5 mm. long (including the elongated style-base), yellowish brown, faintly striate-reticulate: style-base 1/3 as long as the achene body, *elongated, triangular-conic,* or sometimes almost falcate: bristles dark brown, retrorsely toothed, equalling the body of the achene.—Urban, Symb.



Map 21. Range of Eleocharis pachystyla.

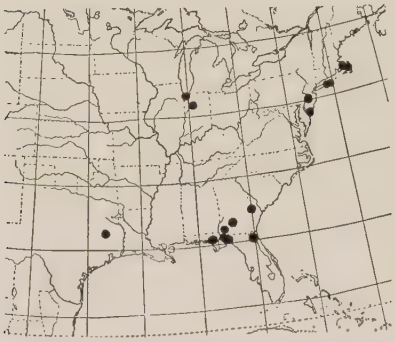
Ant. ii. 72 (1900), and in Contrib. U. S. Nat. Herb. x. 457 (1908); Britton & Wilson, Surv. Porto Rico & Virgin Isl. i. 93 (1923); Standley, Field Mus. Bot. Publ. viii. 263 (1931). *Scirpus melanocarpus* Griseb. Cat. Plant. Cubens. 239 (1886), not Torr. *Scirpus pachystylus* C. Wright in Sauvalle, Fl. Cubana 174 (1873).—CUBA: edge of ponds in pine woods, Pinar del Rio, Sept., *C. Wright* no. 3373 (TYPE coll.) (NY); muddy shore of swamp east of Laguna de la Maguina, Pinar del Rio City, *Ekman* no. 17889 (NY); Sierra de Nipe, ad pedes montis Loma Mensura, Oriente, *Ekman* no. 9106 (NY). PORTO RICO: wet white-sand, vic. Dorado, *Britton, Britton & Brown* no. 6674 (NY). SAN DOMINGO: *C. Wright, Parry & Brummel* no. 582 (NY). COSTA RICA: Cañas Gordas, alt. 1100 m., *Pittier* no. 11025 (NY). COLOMBIA: Rio Huaugubi, near Popayan, 1600–1800 m., *Lehmann* no. 38 (NY); Rio Pedro, west of Popayan, *Pennell & Killip* no. 7200 (NY); Aganche, Dept. El Cauca, 1150–1250 m., *Pennell & Killip* no. 6271 (NY). By C. B. Clarke (1908), *E. pachystyla* is cited also from Venezuela, Trinidad, Guiana and Pernambuco.

E. pachystyla seems to be connected with *E. filiculmis* (*E. sulcata*) and thereby with a group of South American species centering about *E. pachycarpa* Desv. and *E. grandis* Boeckl., both of which are well illustrated by Barros (l. c.).

The varieties *macrostachya* (?*Isolepis nudipes* Kunth) and *angustostachya*, based primarily on Dusén collections from southern Brazil (?) are described by Pfeiffer, Herbarium no. ii. 55 (1921).

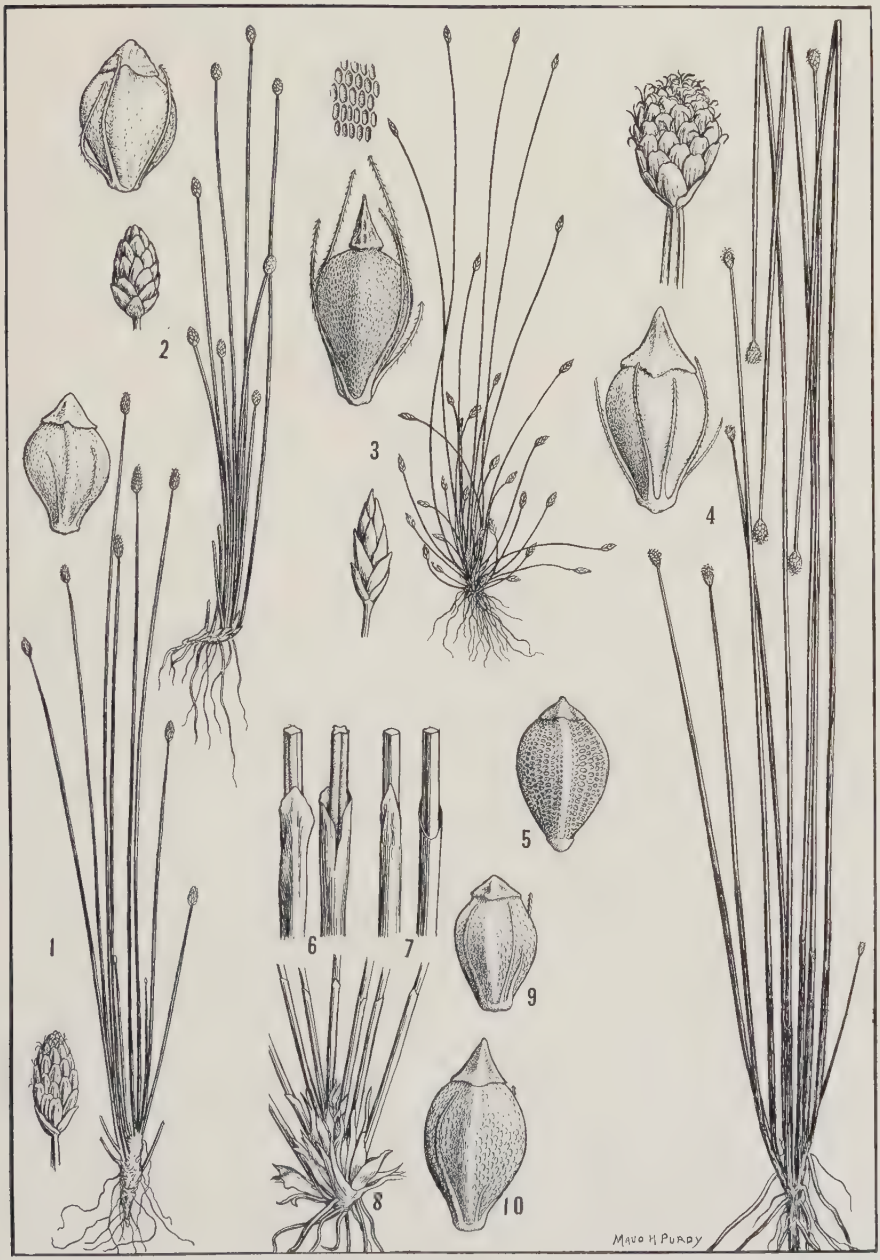
37. E. MELANOCARPA Torr. (PL. 464, FIG, 6). MAP 22. Tufted from a *short thick caudex* with thickened spongy roots, the hardened culm-bases of the previous year persistent: culms firm, *flattened*, sulcate, 2–6 dm. long, often 1 mm. wide, sometimes proliferous at the summit: sheaths truncate with a prominent subulate mucro at the apex: spikelets cylindrical-ovoid, obtuse, many-flowered, 6–15 mm. long: scales firm, obtuse, stramineous with brownish sides and broad scarious margins: stamens 3, anthers 1.5 mm. long: style 3-fid: achene 1.1 mm. long, *dark glossy brown*, trigonous, with *rounded costulate angles, truncate at the broadened apex*, minutely cellular: style-base pallid, low-pyramidal to nearly flat, with *prominent overhanging margin:* bristles dark brown, shorter than the achene, retrorsely toothed, often rudimentary.—Ann. Lyc. N. Y. iii. 311 (1836); Steudel, Syn. Cyp. 76 (1855); Boeckl. Linnaea xxxvi. 445 (1869–70); Britton, Journ. N. Y. Microsc. Soc. v. 107 (1889); Britton & Brown, Ill. Fl. i. 254, fig. 592 (1896); E. J. Hill in Bull. Torr. Bot. Club xxv. 392–394, t. 344 (1898); Robinson & Fernald in Gray, Man. ed. 7, 184, fig. 255 (1908); Small, Man. S. E. Flora 165 (1933).—Damp sand, along the coast, Massachusetts to Texas; also in northern Indiana.—MASSACHUSETTS: Loon Pond, Lakeville, Plymouth County, *Fernald & Long* no. 8897 (G, NY); West Pond, Plymouth, *Wm. Boott* in 1864 (G); in

arenosis inundatis ad Plymouth, *Oakes* (G, NY); Plymouth, *Tuckerman* (G, NY); dry upper sandy beach, Buck Pond, Harwich, *Fernald*, Plant. Exsic. Gray. no. 327 (B, Cal, G, NY); peaty margin of Small Pond, Barnstable, *Fernald* no. 8895 (NY); Half-Way Pond, Barnstable, *Fernald* & *Long* no. 16326 (G); sandy shore, Peters Pond, Sandwich, *Svenson* in 1926 (B). Rhode Island: Providence (?), *Olney* (G, NY). New York: Long Pond, Wading River, *E. S. Miller* in 1871 (NY) and in 1872 (G, NY); Deep Pond, Wading River, *Ferguson* no. 1746 (NY); Artist Lake, Middle Island, *Ferguson* nos. 3155 (NY), and 5086 (NY); Lake Ronkonkoma, *Ferguson* no. 3102 (NY); Lake Ronkonkoma, *Bicknell* no. 937 (NY); Big Long Pond, Sag Harbor, *Ferguson* no. 5831 (NY); Round Pond, Sag Harbor, *Ferguson* no. 2838 (NY); Edwards Pond, Coram, *Ferguson* no. 1760 (NY). New Jersey: pond, Delanco, Burlington County, *W. Stone* in 1907 (NY), *Mackenzie* no. 6044 (NY), *Van Pelt* & *Brown* in 1907 (NY), and *Long* no. 5118 (G, NY); white clay bogs, Bennett, *Mackenzie* no. 5510 (NY). Georgia: wet pine-barrens, Bulloch County, *R. M. Harper* no. 910 (G, NY); shallow margin of Open Pond, Decatur County, *R. M. Harper* no. 1205 (G, NY); Tifton, *Svenson* no. 6922 (B); "from Cinchona Swamp [?] or Augusta road [?]" *Baldwin* in 1817 (type, NY). Florida: sandy lake shore, Walton County, *Curtiss* no. 3082 (B, NY); Jacksonville, *Curtiss* nos. 5609 (B, G, NY) and 5668 (G, NY); nearly dry sink south of Tallahassee, *R. M. Harper* no. 40 (NY); Quincy, *Chapman* (NY). Indiana: wet sandy ground, Dune Park, Porter County, *E. J. Hill* in 1894 (NY), *Umbach* nos. 3817 (NY) and 4468 (B), and *A. Chase* no. 549 (Ill.); southeast of Tefft, Jasper County, *Deam* nos. 48928 (B), 48950 (B), and 48965 (B). Texas: sandy bogs, Oakwood, Leon County, *E. J. Palmer* no. 13404 (B).



Map 22. Range of Eleocharis melanocarpa.

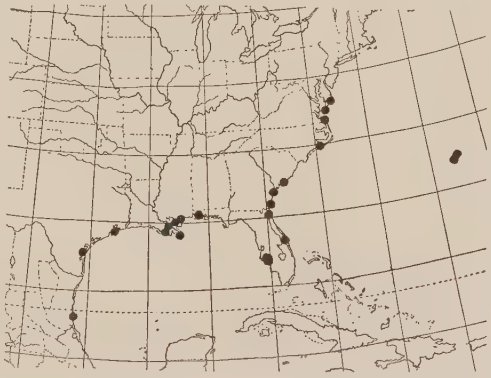
It is probable that Baldwin's type collection came from near St. Mary's, Georgia, where Baldwin lived for some time, perhaps from the Altamaha River region where Baldwin speaks of "Cinchona" [*Pinckneya pubens*] growing in the swamps [See Darlington's Reliquiae Baldwinianae, p. 333]. The proliferous state has been described from Indiana by E. J. Hill (l. c.) but such plants are not at all uncommon in the eastern part of the range, and were long ago seen by Oakes on



ELEOCHARIS, ~~SERIES TENUISSIMAE~~ (habit × ½, spikelets × 2½, achenes × 20). FIGS. 1 and 2, E. FILICULMIS (FIG. 2, *E. calyptrata*). FIG. 3, E. RECLINATA. FIG. 4, E. PACHYSTYLA. FIG. 5, E. GRISEA. FIGS. 6–10, E. MINIMA (sheaths, basal spikelets and achenes).

sandy pond-shores at Plymouth, one of his labels (NY) reading "in wet ground the spikes are all viviparous and it is hard to find a flowering spike. In dry ground no vivip. though many of the culms produce abortive spikes." The affinities of this localized species are obscure, but the relationship—taking into account the small size of the trigonous achenes, their dark color and obscure surface reticulation, and the coastal plain distribution of the plant—would seem closest to *E. Baldwinii.* Its isolated occurrence on the sand dunes of Lake Michigan, where it is associated with other outliers of the flora of the Atlantic Coastal Plain, has been discussed by Peattie, Rhodora xxiv. 59 (1922).

38. E. albida Torr. (Pl. 464, fig. 7). Map 23. Tufted, from a *slender, creeping rootstock:* culms 0.5–3 dm. long, usually wiry, slender, 1 mm. wide in large specimens, lightly striate: sheaths stramineous, often with a brownish base, the apex strongly oblique, acute, somewhat cartilaginous: spikelets cylindric-ovoid, 2–10 mm. long, *obtuse:* scales white to light brown, appressed, obtuse, *cartilaginous,* scarcely keeled, the scarious margin almost lacking: stamens 3, anthers 0.8 mm. long: style 3-fid: achenes 1 mm. long, broadly obovate-trigonous, often contracted at the apex, smooth, *dull to shining brown when mature:* style-base conic-deltoid, pale brown, ¼ as wide as the achene: *bristles dark reddish-brown,* exceeding the achene, with *close-set retrorse teeth.*—Ann. Lyc. N. Y. iii. 304 (1836); Steudel, Syn. Cyp. 78 (1855); Boeckl. Linnaea xxxvi. 442 (1869–70); Britton, Journ. N. Y. Microsc. Soc. v. 108 (1889); Britton & Brown, Ill. Fl. i. 254, f. 593 (1896); Robinson & Fernald in Gray, Man. ed. 7, 184, f. 256 (1908); Small, Man. Southeastern Fl. 165 (1933). *E. simplex* Kunth, Enum. ii. 143 (1837). *E. albida* var. *Berlandieri* Britton, Journ. N. Y. Microsc. Soc. v. 108 (1889). *E. Berlandieri* C. B. Clarke in Urb. Symb. Ant. ii. 162 (1900) and Ill. Cyp. t. xxxix. figs. 17–21 (1909). *E. bermudiana* Britton, Journ. N. Y. Bot. Gard. xiii. 191 (1912), and Fl. Bermuda 52, fig. 79 (1918).—Brackish shores, Maryland to Mexico; Bermuda.



Map 23. Range of Eleocharis albida.

Maryland: Ocean City, *Canby* in 1893 (NY). irginia: Eastville, Northampton County, *Canby* in 1868 (G); False Cape, Princess Anne County, *Fernald, Griscom* & *Long* no. 4565 (B, G) and *Fernald* & *Long* no. 3767 (B, G) (bristles unusually light). North Carolina: Beaufort, *I. F. Lewis* no. 68 (NY) (some of *achenes* proliferous). South Carolina: Sullivan's Island, Charleston, *Ravenel* (G, NY); Carolina, ad rupes fluvium, *Beyrich* (Camb.) (as *E. simplex*). Georgia: Cumberland Island, Camden County, *R. M. Harper* no. 1550 (G, NY); Montgomery, Chatham County, *R. M. Harper* no. 1825 (G, NY); Talbot Island, *Baldwin* (type, NY). Florida: Appalachicola, *Chapman* (NY) and Biltmore Herb. no. 2299a (G, NY); Indian River, *Curtiss* no. 3072 (G, NY); Ft. Meyers, *J. H. Simpson* (G, NY), and *A. S. Hitchcock* no. 402 (G); Titusville, Brevard County, *Nash* no. 2312 (G, NY); Jacksonville, *Curtiss* no. 5675 (G, NY). Alabama: Mobile, *Mohr* in 1896 (as *E. capitata*?) (NY). Mississippi: Ship Island, *Tracy* no. 4878 (NY); Biloxi, *Tracy* no. 5335 (NY). Louisiana: New Orleans, *Drummond* no. 406 (G); South Pass, *Lloyd* & *Tracy* no. 392 (G, NY); New Orleans, *Dr. Ingalls* (NY); Barataria, *Dr. Ingalls* (NY). Texas: Neuces River, *Berlandier* nos. 2425 (type coll. of *E. Berlandieri*) (G, NY), 995 (G, NY) and 3226 (G, NY); Neuces Bay, Corpus Christi, *Ravenel* nos. 7 (NY), 73 (NY); Galveston, *Reverchon* no. 2897 (NY) and *Plank* in 1892 (NY). Mexico: Tampico, *E. Palmer* no. 570 in 1910 (Cal, G, US). Bermuda: South Shore Road, Devonshire, *Britton* & *Brown* no. 240 (type of *E. bermudiana*) (NY); Camden Marsh, *Brown, Britton* & *Bisset* no. 1898 (NY); Shelby Bay, *Harshberger* in 1905 (NY); *Moseley* (NY); Tucker's Town, *Britton* & *Brown* no. 1615 (NY).

Torrey's type specimens were small plants with culms only 6–8 cm. high, but I can seen no distinction, except in size, between these and the larger plants described as *E. Berlandieri* and *E. bermudiana*. Numerous intermediate forms occur in the southeastern United States. *E. albida* does not seem to be closely related to any other species.

Explanation of Plate 460

(Details of surface markings accompany some of the achenes)

Fig. 1, Eleocharis minima (*E. Durandii*), Costa Rica, *Standley* no. 29082; 2, E. minima (*E. Jamesonii*), Ecuador, *Hitchcock* no. 20087; 3, E. minima (*E. Wrightiana*), Cuba, *C. Wright* no. 3369; 4, E. minima var. ambigua, Brazil, *Gross*, no. 20513, achene from *Salzmann* specimen (Cambridge); 5, E. urceolata, Mexico, *Liebmann;* 6, E. oligantha, Cuba, *C. Wright* no. 3368; 7, E. minima, Brazil, *Regnell* III, no. 1307; 8, E. alveolata, Cuba, *Ekman* no. 17788; 9, E. microcarpa var. filiculmis, New Jersey, *Svenson* no. 3459; 10, E. microcarpa, Louisiana, *Ingalls* (type); 11, E. microcarpa var. Brittonii, Georgia, *Harper*, no. 639; 12, E. Baldwinii, Georgia, *Harper* no. 1176; 13, E. Baldwinii, Florida, *Small* no. 4417.

Explanation of Plate 461

Fig. 1, Eleocharis minima (type of *E. oropuchensis*), Trinidad, *Britton, Hazen & Freeman* no. 1155; 2, E. glauca, Brazil, *Spruce;* 3, E. subcancellata, Mexico, *Pringle* no. 3430 (NY); 4, E. Brainii, Nile Land, *Schweinfurth* no. 2583; 5, E. subfoliata, Brazil, *Spruce;* 6, E. Naumanniana, French Guinea, *Caille* no. 14957; 7, E. caespitosissima, Madagascar, *P. de la Bathie* no. 17953; 8, ? E. nigrescens, Brazil, *Gardner* no. 2373; 9, E. amazonica, Brazil, *Spruce;* 10, E. Chaetaria, Ceylon, hb. *Wight* no. 2895; 11, E. retroflexa, Cuba, *Ekman* no. 236; 12, E. vivipara, Florida, *Curtiss* no. 3088; 13, E. Schweinfurthiana, Nile Land, *Schweinfurth* no. 1949; 14, E. nigrescens (*E. Perrieri*), Madagascar, *P. de la Bathie* no. 17947.

Explanation of Plate 462

Fig. 1, Eleocharis minima var. bicolor (type of *E. savannarum*), Trinidad, *Britton*, no. 2491; 2, E. bicolor, Georgia, *Harper* no. 1711; 3, E. uncialis, Florida (achene from type); 4, E. Barrosii (type from Argentina); 5, E. nigrescens, Cuba, *León & Roca* no. 6997; 6, E. nigrescens (cotype of *E. Hildebrandtii*), Africa, *Chandler* no. 1372; 7, E. nigrescens (type from Brazil); 8, E. nigrescens var. minutiflora, Cuba, *C. Wright* no. 3766; 9, E. nigrescens var. minutiflora, Cuba, *Ekman* no. 17945; 10, E. trilophus (type from Africa); 11, E. anceps, Africa, *Mann* no. 891; 12, E. nana, Brazil, *Burchell* no. 3137; 13, E. minutissima (type from Cuba); 14, E. microcarpa (type of *E. cubensis*), *C. Wright* no. 3765.

Explanation of Plate 463

Fig. 1, E. geniculata from Colombia, *Archer* no. 75 (showing habit and immature flower); 1a, *Fredholm* no. 4252, Porto Rico (achene and portion of culm); 2, E. nodulosa, Bolivia, *Fiebrig* no. 2328; 3, E. densa, Mexico, *Arsène* no. 275.

Explanation of Plate 464

Fig. 1, E. tuberculosa f. retrorsa, Massachusetts, *Oakes;* 2, E. tuberculosa f. pubnicoensis, Nova Scotia, *Fernald, Long & Linder* no. 20164; 3, E. tuberculosa (typical), Florida, *Curtiss* no. 3096; 4, E. tortilis, South Carolina, *Ravenel;* 5, E. cylindrica, *Buckley*, Valley of Lower Rio Grande, Texas; 6, E. melanocarpa, Florida, *Curtiss* no. 3082; 7, E. albida, Florida, hb. *Chapman.*

Explanation of Plate 465

Fig. 1, E. filiculmis, Panama, *Standley* no. 29168; 2, E. filiculmis (type of *E. calyptrata*), Mexico; 3, E. reclinata, Maine, *Gray Herb. Exs.* no. 9; 4, E. pachystyla, Porto Rico, *Britton, Britton & Brown* no. 6674; 5, E. grisea (cotype from Cuba). E. minima (*Hitchcock* no. 20087, Ecuador): Figs. 6, 7, sheath-apices; Fig. 8, base of plant showing basal spikelets; Fig. 9, achene from normal spikelet; Fig. 10, achene from basal spikelet.

THREE AQUATICS FROM SOUTHERN MAINE

Norman C. Fassett

Eleocharis parvula (R. & S.) Link, f. **spongiosa**, n. f., culmis spongiosis septatis ad 1 mm. diametro.—Brackish mud near low tide level, Kennebec River, Woolwich, Maine, August 16, 1933, *N. C. Fassett*, no. 16036 (type in the Herbarium of the University of Wisconsin).

This is an estuarine form with spongy culms, which so closely resembles a little sterile *Sagittaria* that it was mistaken for a member of that genus when found by Dr. H. K. Svenson and the writer on the tidal shores of the St. Lawrence River, and was, indeed, later treated as such by Dr. Svenson.[1] Its true identity is shown by a collection from Temiscouata, Quebec, *Victorin*, no. 564, in which a few of the culms bear small, apparently sterile, spikelets. In addition to its occurrence on the St. Lawrence and the Kennebec estuaries, the writer has found it on several estuaries on the northern and eastern coasts of New Brunswick and on the Sheepscot River at Alna, Maine, while Dr. Svenson has collected it on tidal mud of the Hudson River at Peekskill, New York.

Pontederia cordata L., f. **taenia**, n. f., foliis submersis sine laminis, linearibus 3–5 mm. latis translucentibus, vel emersis cum laminis 5 mm. latis petiolisque 2–3 mm. latis.—Shallow mucky cove, Damariscotta Lake, Jefferson, Maine, August 28, 1936, *N. C. Fassett*, no. 16067 (type in Herbarium of the University of Wisconsin); shallow water of a stream, Readfield, July 13, 1933, *N. C. Fassett*, no. 15893.

The leaves of Pickerelweed are variable as to the shape of the blade, and several forms have been recognized.[2] But in the form here proposed, blades are usually quite lacking, or if present are scarcely differentiated from the petiole. The plants, both as to submerged and emersed leaves, superficially suggest forms of *Sagittaria graminea*, from which they may be distinguished by the finer and less conspicuous cellular reticulation of the phyllodia.

Podostemon ceratophyllum Michx. Collins Dam, West Gardiner, Maine, August 18, 1936.

The water of Cobbosseecontee Stream, before widening into a pool below Collins Dam, is a foot deep over a stony bottom, and so swift that the fisherman working his line into the pool can only with difficulty maintain his footing. The bridge below the pool went out in the floods of March, 1936, and in August the water was held back during construction of a new bridge, exposing the *Podostemon*. The suggestion of Dr. Muenscher[3] is called to mind, that perhaps this plant is not as rare as it is generally supposed to be, for its presence would ordinarily not be suspected beneath the white water of the rapids.

Madison, Wisconsin.

[1] Rhodora xxxi. 169 (1929).
[2] See Fernald, Rhodora xxvii. 80 (1925).
[3] Rhodora xxxiii. 166 (1931).

A NEW COLUMNEA FROM JAMAICA

LYMAN B. SMITH

AMONG several rare species of *Gesneriaceae* collected in Jamaica by Mr. Francis Welles Hunnewell, I find one *Columnea* which does not agree with any known West Indian species of that genus. It is a pleasure to name this new species after its discoverer, as follows:

COLUMNEA **Hunnewellii**, sp. nov. (FIGS. 1 et 2), caulibus repentibus radicantibus, hornotinis pilis articulatis purpureis dense

COLUMNEA HUNNEWELLII

obsitis; foliis 5–15 mm. longe petiolatis in pari paulo inaequalibus ellipticis basi apiceque acutis basi obliquis 3–5 cm. longis 15–24 mm. latis dentatis supra parce adpresseque pilosis obscure viridibus subtus inter nervos breve ad nervos longius pilosis pallidioribus; floribus in axillis solitariis subsessilibus; sepalis lineari-lanceolatis 11–13 mm. longis 1–2 mm. latis grosse 3–4-dentatis margine pilis longis articulatis purpureis ciliatis; corolla ex sicco rubra et striis 5 luteis longitrorsis

notata 28 mm. longa 6.5 mm. diametro subcylindrica parce pilosa sub apice paulo contracta basi dorso semigloboso-inflata, lobis erectis subaequalibus 1.5–2 mm. longis obtusis; antheris omnes inter sese cohaerentibus; bacca globosa apiculata 7 mm. diametro glabra rubra.—Jamaica: County of Middlesex, St. Ann Parish, trailing over rocks in forest, Mt. Diablo, March 12, 1936, *Hunnewell & Griscom 14481* (type, unicate, in Gray Herb.)

Columnea Hunnewellii appears to be most closely related to *C. jamaicensis* Urban, from which it differs in its coarsely toothed sepals and much smaller corolla-lobes. Its inclusion in the section *Pterygoloma* Hanst., however, will necessitate the redefinition of that section to include species with dentate sepals.

Gray Herbarium.

Braya humilis (C. A. Meyer) Robinson, var. **leiocarpa** (Trautv.), comb. nov. *Sisymbrium nanum* Bunge, var. *leiocarpum* Trautv. in Act. Hort. Petrop. v. 25 (1877). *Pilosella novae-angliae* Rydb. in Torreya, vii. 158 (1907). *Arabidopsis novae-angliae* (Rydb.) Britton in Britton & Brown, Ill. Fl. ed. 2, ii. 176 (1913), as to type. *B. humilis*, var. *novae-angliae* (Rydb.) Fernald in Rhodora, xx. 202 (1918).—M. L. Fernald.

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